NOVEMBER, 1942

SPHERON "C"

Newsletter No. 11 *PUBLISHED BY RUBBER CHEMICALS DIVISION OF* DU PONT *NOV., 1942*

2-MT-Accelerator 808 Combinations Impart Desirable Properties to Buna S

IT is expected that a major portion of the Buna S to be produced will be used for the manufacture of pneumatic tires. Accordingly, when studying the compounding of Buna S, it is necessary to keep always in mind the physical properties required of stocks that are used in tire construction. Under service conditions a pneumatic tire is exposed not only to abrasive wear and flexing but also to continued distortion which causes friction within the tire itself and results in an increase in temperature.

The most important function of 2-MT-808 acceleration in Buna S is to produce stocks that exhibit to a high degree the properties required in pneumatic tire carcasses and treads. The high resilience, low hysteresis, and good abrasion resistance of Buna S stocks accelerated with 2-MT-808 warrant your investigation.

2-MT—808 COMBINATIONS— 2-MT activated with Accelerator 808 is a particularly interesting accelerator combination for Buna S. Not only is the combination more economical to use than 2-MT alone, but it produces vulcanizates having better all-round physical properties. Buna S vulcanizates accelerated with 2-MT-808 are characterized by high moduli and tensile strengths and high elongations at break. While they compare favorably in these properties with Buna S stocks accelerated with Thionex (see Newsletter No. 9, September, 1942) the rate of cure at vulcanizing temperatures is not so fast and the curing range is not as broad as with Thionex.

The most outstanding characteristics of 2-MT-808 accelerated Buna S stocks are their high resilience and low mechanical hysteresis (low heat build-up). These properties, which are of particular importance in applications involving severe dynamic service (such as pneumatic tires,) are illustrated by the data in the accompanying table.

COMPARISON WITH OTHER ACCELERATORS— 2-MT-808 acceleration of Buna S has advantages over other commonly used accelerators such as straight MBT, mercaptobenzothiazole reaction products and activated MBTS. The 2-MT-Accelerator 808 combination has a faster rate of cure and produces vulcanizates having higher moduli and tensile strengths, and superior resilience. If the curing time is adjusted so that the same state of cure is obtained in all stocks, the ultimate elongations at break and tear strengths are comparable. For any given time of cure at 287°F., vulcanizates accelerated with 2-MT-808 show only very slight impairment of stress-strain relationship when the cure is extended to as long as 180 minutes.

BUNA S COMPOUNDS ACCELERATED WITH 2-MT ACTIVATED BY ACCELERATOR 808

Compound No. 1693B—	314	329
Filler	50 parts Channel Black	30 parts Soft Black
Scorch Test—Cure 60 minutes at 227°F.		
Tensile Strength p.s.i.	125	100
Elongation at Break—%	745	885
Original Physical Test Data Cure 60 minutes at 287°F.		
Stress at 300% elongation p. s. i.	1800	625
Tensile strength p. s. i.	2825	1325
Elongation at Break—%	410	460
Hardness—Shore A Durometer	68	51
Tear Strength—lbs. per inch thickness	145	60
*Permanent Set in Elongation (ASTM) %	6	4
Pellet Tests Cure 130 minutes at 287°F		
Resilience (Yerzley Oscillograph) %	58	72.7
Heat Build-up (Goodrich Flexometer in 20 min. expressed as °C.)	56	67
Aged in 100°C. Air Oven Cure 60 minutes at 287°F		
Tensile Strength p.s.i.	1925	850
Elongation at Break—%	135	230
Hardness—Shore A Durometer	79	58

*Stretch samples 200%; hold 10 minutes; release and measure after 10 minutes rest.

Through the Mill

NATURAL AGING *resistance of neoprene vulcanizates has been shown to be excellent by a number of accelerated laboratory tests. In addition, the outstanding aging properties of neoprene have been confirmed by aging neoprene vulcanizates in the dark for 8 years at a temperature of 82°F. The following data clearly illustrates the natural aging resistance of neoprene. The formula that was used was:*

*Neoprene Type D**	100
Extra Light Calcined Magnesia	10
FF Wood Rosin	5
Neozone D	2
Sulfur	1
Zinc Oxide	10

**Type D has been replaced by our improved Type E.*

Yrs. Aged	Mod. 500%	Tb psi	Eb. %
0	1100	3700	1000
0.5	1150	3900	1000
2.0	1150	3900	900
4.0	1275	3650	850
8.0	1400	3375	810

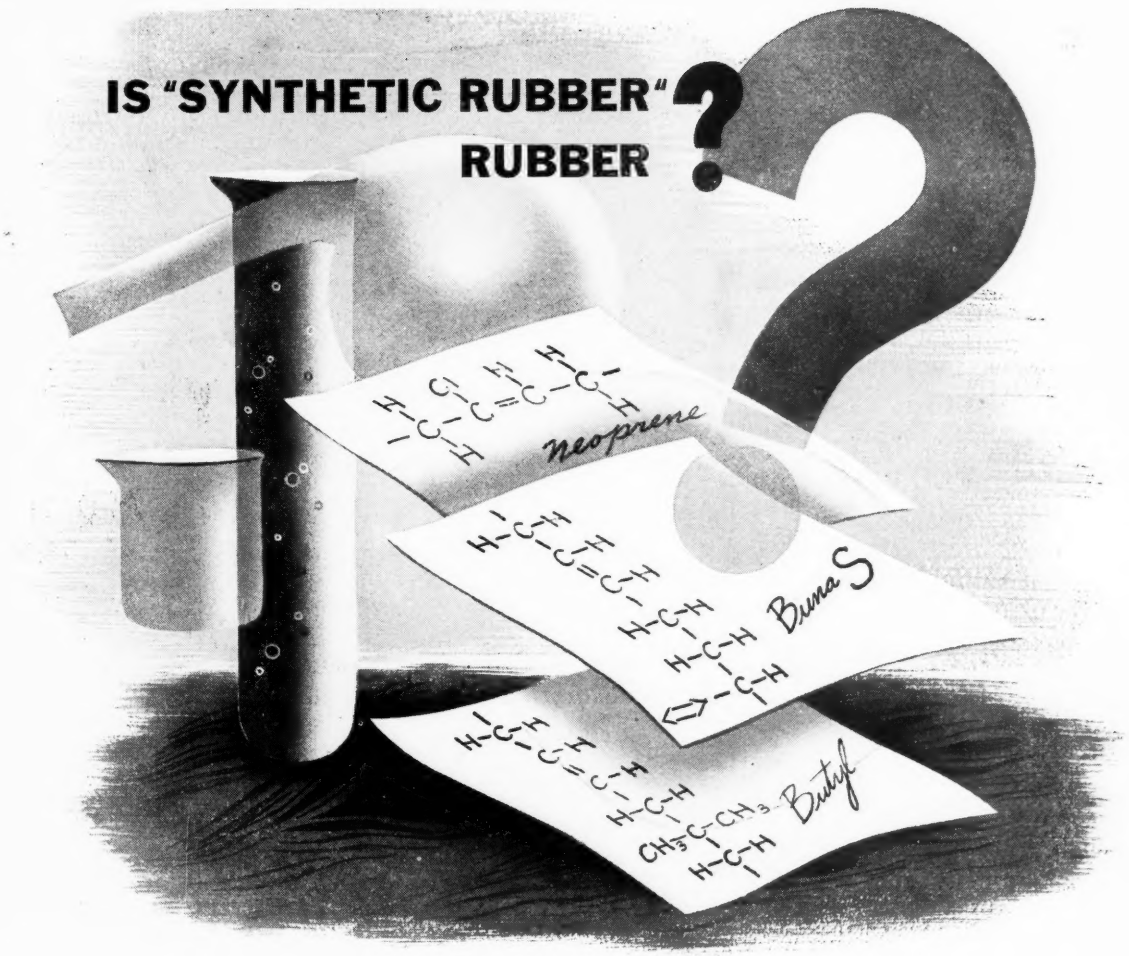
EXPERIMENTAL QUANTITIES *of neoprene for use in developing stocks for products permitted by Order M 15-b are obtainable from us without specific allocation by the W.P.B. We are granted an experimental allocation each month from which we are permitted to ship experimental quantities of neoprene to any qualified manufacturer who is carrying out a development program. When the project reaches the production stage, allocations from the W.P.B. are necessary before we can make shipment.*

BUNA S COMPOUNDING *is one of our most important development projects. Make the du Pont Rubber Laboratory your headquarters for information concerning Buna S.*

RUBBER CHEMICALS DIVISION

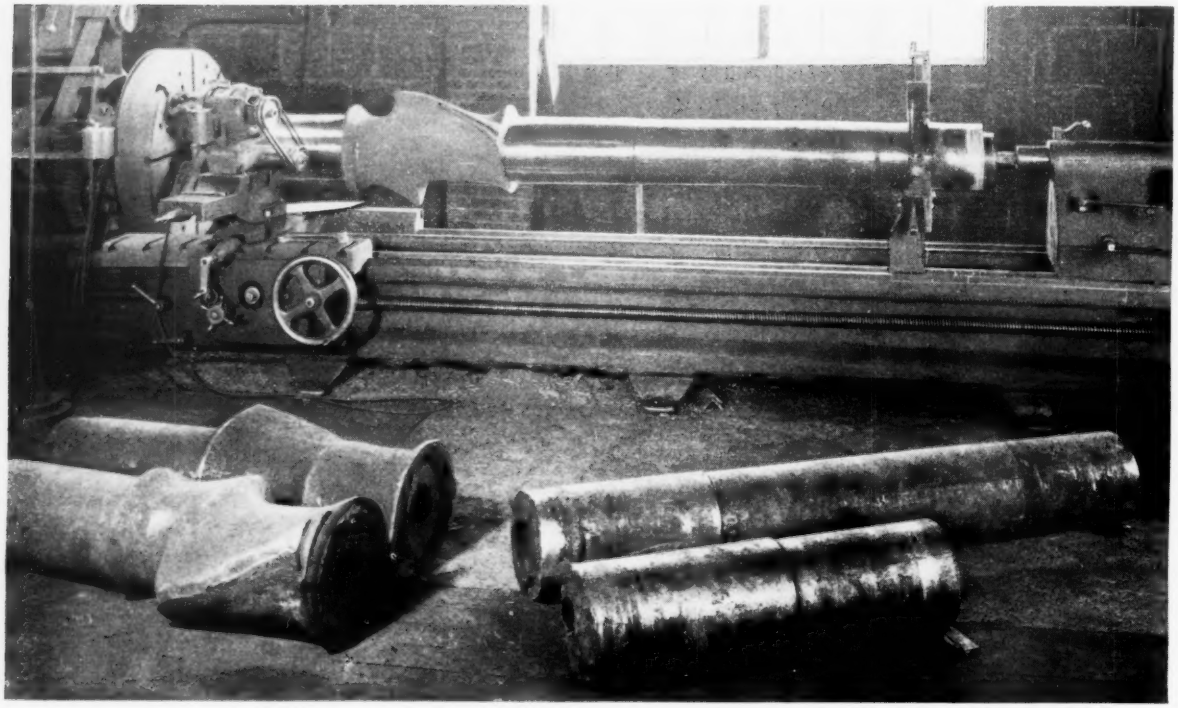
Wilmington DU PONT *Delaware*

INDIA RUBBER WORLD, November, 1942, Vol. 107, No. 2. Published monthly by BILL BROTHERS PUBLISHING CORP. Printing office, Philadelphia, Pa. Editorial and advertising offices, 386 Fourth Avenue, New York, N. Y., U. S. A. Entered as second-class matter October 5, 1889, at the Post Office at Philadelphia, Pa., under the act of March 3, 1879. Subscription, United States and Mexico, $3.00 per year; all other countries, $4.00; single copies, 35 cents.



TO THE rubber chemist and manufacturer of rubber products, these chemical formulas are new raw materials which must be vulcanized, processed and fabricated into useful forms. But since they are basically different from rubber, processing them into such a complex product as a tire, for example, presents a completely new set of chemical problems. For many of the compounding materials used with latex cannot be used with the synthetics.

Here is a situation that calls for chemical ingenuity of the highest order. Developing the new compounds was only the beginning of the job. Finding the right processing materials to make them effective is as great, if not a greater problem. In this field Wishnick-Tumpeer, Inc. has been particularly successful. Special Witco Carbon Blacks, for instance, are helping to make synthetic tires tougher and more durable. Again, Stearite, a specially developed synthetic stearic acid, has made improvements in compounding possible. And No. 20 Softener, another product of the Witco research laboratory, has helped to solve a specific processing problem. Thus, one by one, difficulties are being solved by energetic, intelligently directed research. This close cooperation with the rubber industry is part of the service Wishnick-Tumpeer gives to the many industries using chemicals, oils, pigments, asphalts and allied products.



Don't Let This Happen To You!

Without delay or time loss Banburys must meet a production obligation . . . Bad breaks are set-backs in the schedule to Victory. Many times such breaks can be avoided by having Interstate rebuild or repair a known fault or worn part before the break occurs. Interstate Service has specialized for years on Banbury maintenance . . . It is doing its part now — not only in meeting problems like that represented in the above illustration, but in redesigning and re-building Banburys to give greater production more efficiently.

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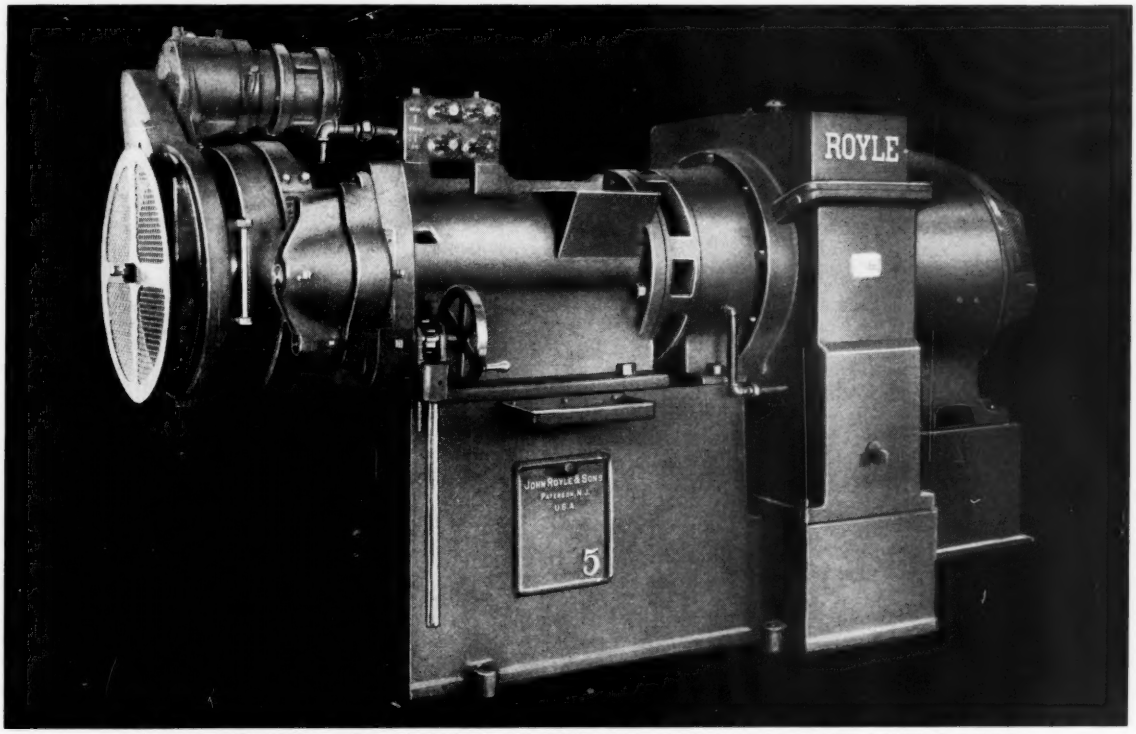
TIMES *have* CHANGED



8½ INCH EXPANSION TYPE GATE-HEAD STRAINER WITH MANUALLY-OPERATED LOCKING DEVICE.

Since Grandpa was a boy, a great many changes have been made. The "Spreading Chestnut" has branched out and "the village smithy" now owns two garages and a string of filling stations.

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7932

is a Pequanoc Reclaim of this type. We would be glad to send samples or further information.

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The Block of Rubber that didn't Bulge!

OIL and rubber *never* got along until Thiokol* synthetic rubber was offered commercially thirteen years ago. After that, industry found hundreds of uses for this pioneer American synthetic.

To name a few: oil-proof service station hose, gaskets, grommets, packings... corona-resisting cable sheaths... ink-proof printing press rollers and newspaper blankets.

Today, war uses for Thiokol synthetic rubber naturally come first. Except to say that it is a vital material in the construction of airplanes, tanks and ships, little information on these military applications can be disclosed.

No secret, however, is the fact that the Thiokol Corporation research and development staff has amassed a wealth of data on new forms and new applications that multiplies the usefulness of Thiokol synthetic rubber.

For war product problems, this data and prompt technical cooperation are yours for the asking.

Thiokol Corporation, Trenton, New Jersey

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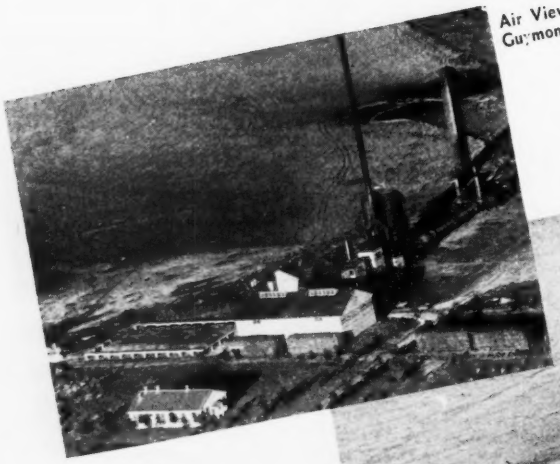
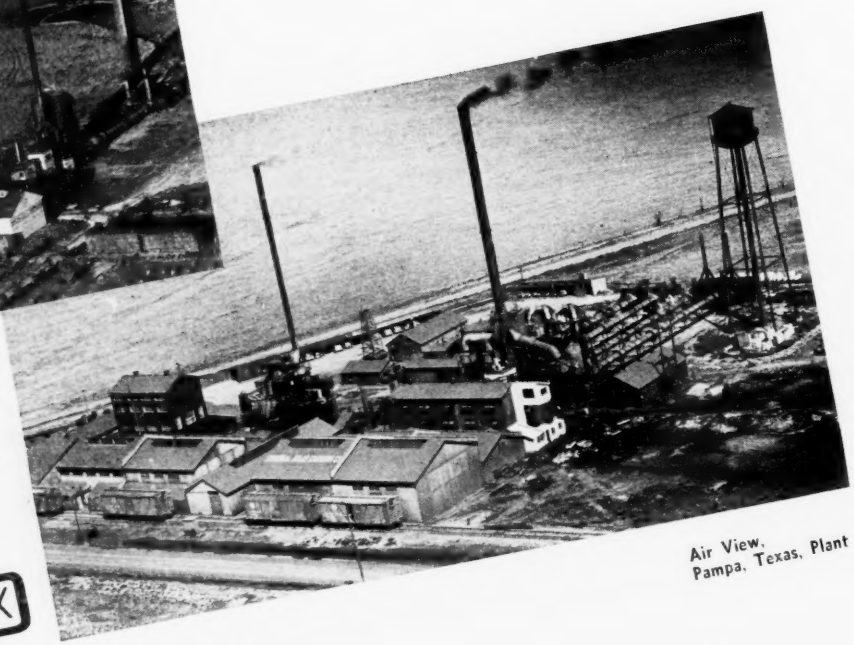


Air View, Guymon, Okla., Plant



Air View, Pampa, Texas, Plant

GASTEX TRADE MARK

PELLETEX TRADE MARK

SYNTHETICS and SERVICE

GASTEX and PELLETEX are vital to the synthetic rubber program. General Atlas, with its two plants located in different states and gas fields, on two railroads and with two labor sources, is well equipped to do its part in providing a dependable, steady supply. Plans for again increasing the capacity are underway for 1943.

Recently, the entire management has been concentrated at the Pampa plant in order that the utmost in production efficiency, speed and delivery may be assured. Service continues to be the keynote of the producers and distributors of these very popular special process blacks.

HERRON & MEYER

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To offset the terrific heat generated in heavy-duty tires, do as many companies are doing, change over to Continental "AA." This new type black contributes less to heat generation than do standard grades — *enough* less to offset the *extra* heat that causes most heavy-duty tire failure. Leading tire manufacturers have confirmed this after exhaustive tests with Continental "AA" in their own formulations.

The lower heat generating characteristics of Continental "AA" are the result of special processing, and maintain just the right balance between wear-resistance in the tread compound and heat generation in the tire itself. In these times, when truck, bus and combat tires are subjected to the severest operating conditions, often in very hot climates, the contribution of Continental "AA" is a vital one.

IT'S EASIER PROCESSING, TOO!

Continental "AA" is easier processing, too — another advantage over standard blacks customarily used for passenger car tires, and particularly welcome in wartime production.

To meet the demand for this type black, Continental has rearranged its production set-up and now can supply as much as may be required. The same high quality that characterizes all grades of Continental Black applies to this new low heat generating type. Send for samples — find out how completely Continental "AA" fills your needs.

TRY IT IN YOUR BUNA S FORMULATIONS

Experimenting with this type synthetic rubber? Now is an excellent time to investigate the characteristics of Continental "AA" in your Buna S formulations. Samples for this purpose are also available on request.

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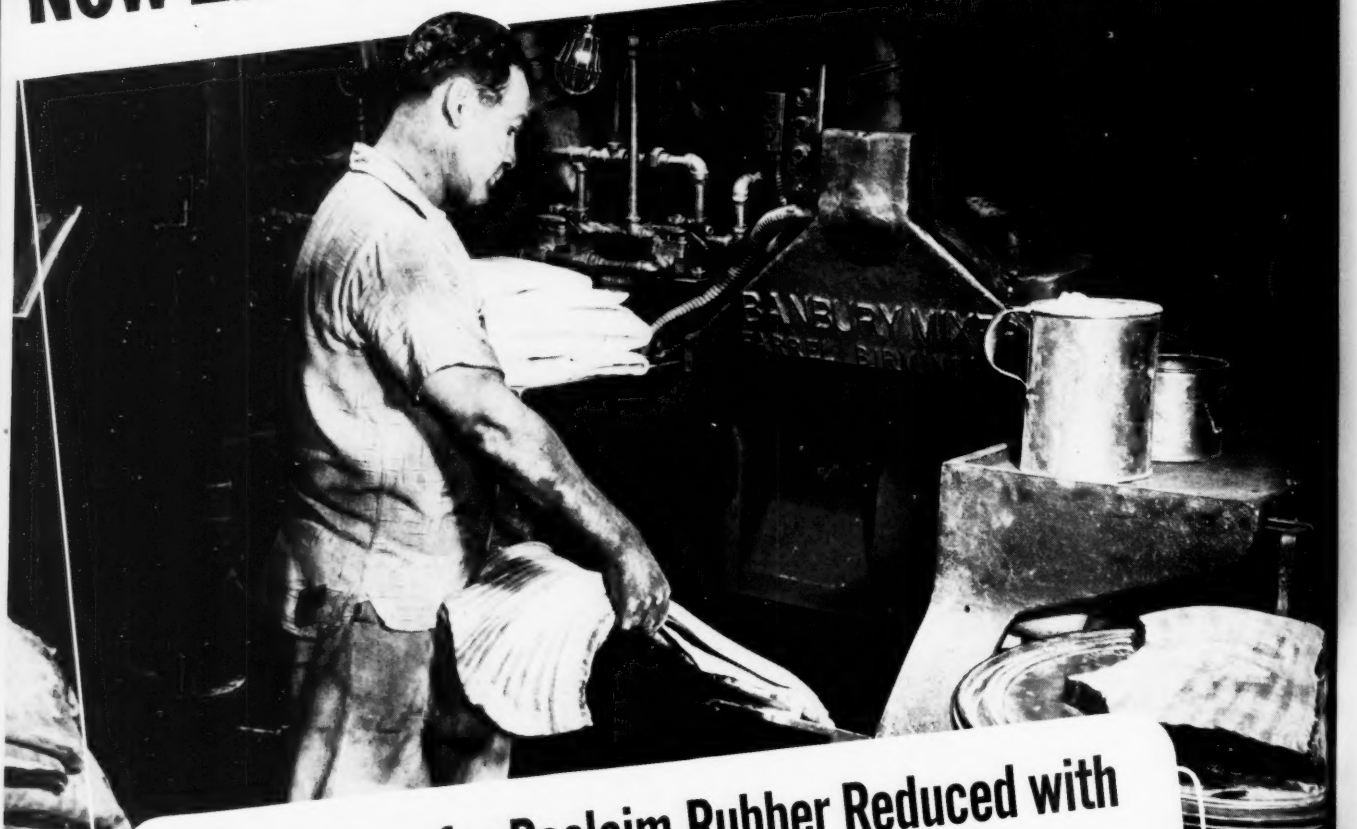

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- **MISTING FROM COMPOUND ELIMINATED . . . due to Circo Light high boiling point.**

This is but one of the many instances in which SUN Circo Light is helping manufacturers of rubber products to speed up processing . . . to reduce cost of compounding . . . to increase percentage of inert material . . . to produce more goods from rubber stocks on hand . . . to maintain desired physical characteristics. Ask a Sun Doctor of Industry to tell you how SUN Rubber Processing Oils can help you accomplish similar results. Write . . .

SUN OIL COMPANY • PHILADELPHIA

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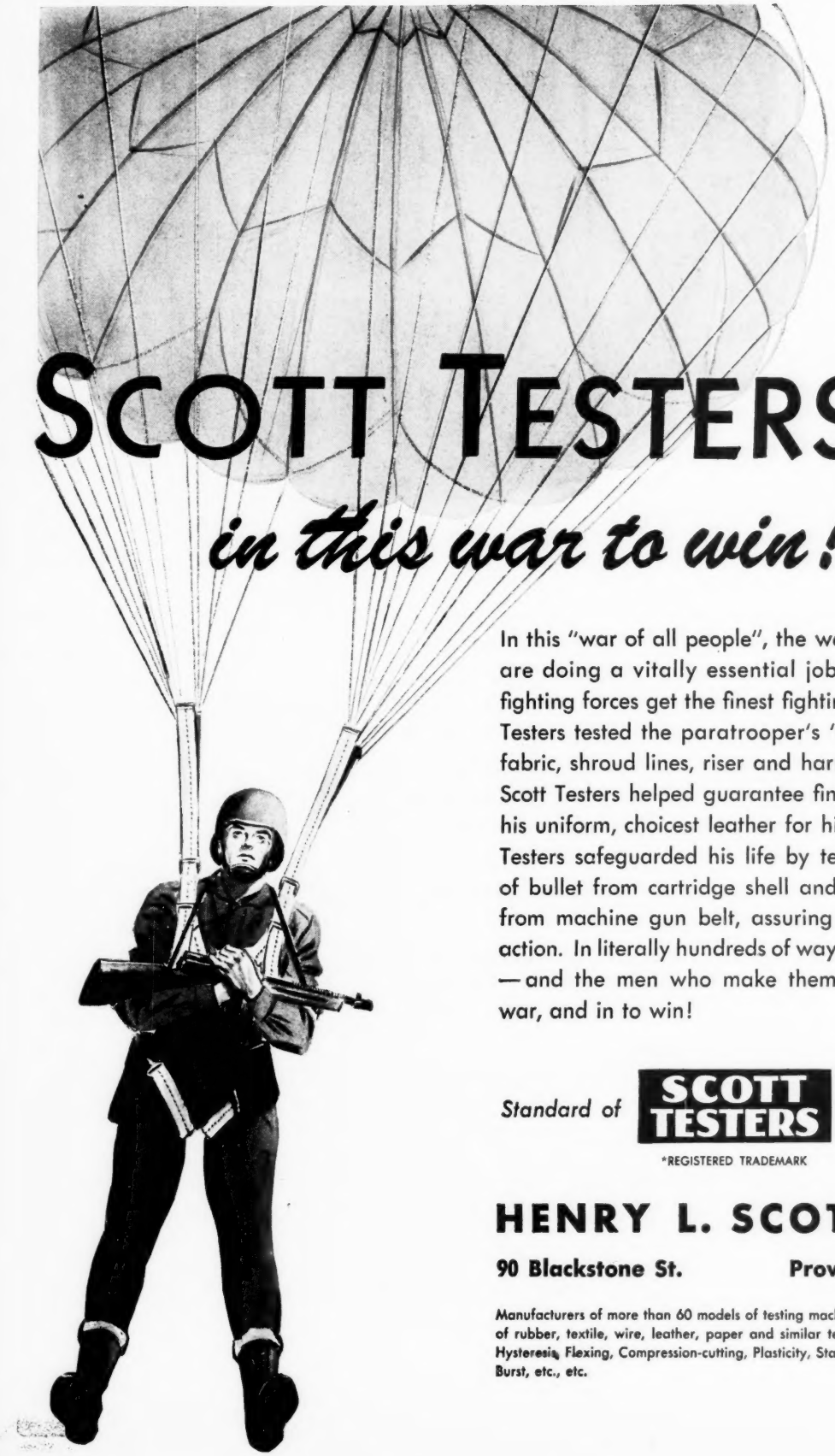

SCOTT TESTERS *are in this war to win!*

In this "war of all people", the workers at Scott are doing a vitally essential job, helping our fighting forces get the finest fighting tools. Scott Testers tested the paratrooper's 'chute canopy fabric, shroud lines, riser and harness webbing. Scott Testers helped guarantee finest fabrics for his uniform, choicest leather for his boots. Scott Testers safeguarded his life by testing the pull of bullet from cartridge shell and of cartridges from machine gun belt, assuring perfect firing action. In literally hundreds of ways, Scott Testers — and the men who make them — are in the war, and in to win!

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ONE form of waste in the rubber industry which can be easily prevented is that which occurs when rubber stocks stick to untreated liners. This usually results in a waste of some of the rubber and a loss of time, effort and materials when the rubber has to be stripped from the liner and reworked.

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Barrett

THE BARRETT DIVISION
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EXTENDER – up to 15% of the rubber hydrocarbon.

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The staff of the Barrett Research Laboratories will be glad to cooperate with you in the use of Carbonex S and other Barrett rubber compounding materials to meet your requirements. Wire or write today for full information.

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November, 1942

VOLUME 107 NUMBER 2

A Bill Brothers Publication

INDIA RUBBER WORLD

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B. BRITTAIN WILSON, General Manager
ROBERT G. SEAMAN, Technical Editor
EDWARD V. OSBERG, Technical Consultant
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INDIA RUBBER WORLD

Published at 386 Fourth Avenue, New York, N. Y.

Volume 107 **New York, November, 1942** **Number 2**

Electric Cable Insulation from Synthetic Rubbers—I[1]

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Robert R. James,
Associate Rubber Technologist, Rubber Laboratory, Navy Yard, Mare Island, Calif.

SEVERAL years ago a program of investigation and testing was undertaken with a view toward the possible utilization of various materials in lieu of natural rubber. Some of the results have already been published.[2] In the course of that phase of the program which deals with electrical insulating materials a study has been made of a number of types of synthetic rubber and rubber substitutes. The behavior in light aging tests of 40% wire insulation compounds containing these materials has recently been reported.[3]

The purpose of this article is to present additional data on the physical and electrical properties of these compounds, when tested according to methods usually employed for rubber compounds both in slab form and as insulation on wires covered with the compounds.

Inasmuch as these materials were synthesized and compounded in an attempt to produce something as nearly like rubber as possible, it was only fair that they should be tested according to the methods which ordinarily apply to rubber. It is likewise fair to regard the data, having been carefully compiled from tests carefully made, as representing an evaluation of the materials as *substitutes* for rubber as judged by rubber standards. Therefore detailed discussion of the results appear unnecessary and no interpretation of them will be attempted here.

However, these data should not be regarded as indicative of whether synthetic rubbers are "good" or "bad" as electrical wire insulation. It is believed that judgment should be reserved until further tests are made on compounds synthesized primarily for application to electric wire, and tested according to methods calculated to measure their worth as *elastic dielectric materials*, with full recognition of the fact that *substitutes for rubber*, virtue by virtue and fault by fault, may be a temporary expedient, but not the primary objective.

This first installment will deal with compounding, curing, and results of tests on basic properties including original and oxygen and air-bomb test results for tensile strength, modulus, and elongation. Besides the effect on original tensile and elongation of immersion of the stocks into organic solvents is included.

The second installment will deal with properties which have a bearing on the suitability of the stocks for wiring insulation and in addition to tests on strictly electrical properties will deal with physical tests peculiar to the problem of determining the suitability of an insulating material to the various types of wear to which it will be exposed during its use.

Formulas of Wire Compounds

In compounding the various rubbers, the following requirements were considered:

(a) A 40% wire insulation was chosen rather than a 30% insulation since its properties would be more greatly dependent upon the nature of the rubber component with which this investigation was primarily concerned.

(b) The pigment loading should furnish good physical properties, good electrical properties, and good processing in a continuous wire insulating machine. A combination of zinc oxide and lithopone has been used for this purpose with satisfactory results by the manufacturers of insulated wire.

(c) The amount and the type of accelerators and the amount of curing agent should be so adjusted that the unvulcanized rubber will process without "scorching" and

[1] The opinions or assertions contained herein are the private ones of the writers and are not to be construed as official or reflecting the views of the Navy Department or the naval service at large.

[2] T. A. Werkenthin, D. Richardson, R. F. Thornley, and R. E. Morris, INDIA RUBBER WORLD, Nov. 1, 1941, pp. 143-46, Dec. 1, pp. 264-68; *Rubber Age (N. Y.)*, Nov., 1941, pp. 103-108, Dec., pp. 199-202. R. E. Morris, R. R. James, and T. A. Werkenthin, INDIA RUBBER WORLD, March 1, 1942, pp. 565-69. R. E. Morris, F. J. Gorman, T. A. Werkenthin, and J. B. Lunsford, *Rubber Age (N. Y.)*, Sept., 1942, pp. 479-81.

[3] R. E. Morris, R. R. James, and T. A. Werkenthin, *Rubber Age (N. Y.)*, June, 1942, pp. 205-208.

the vulcanized rubber will have satisfactory initial and aged physical properties. It is usually assumed that if a stock does not show too great a set-up after two hours at 200° F., it can be processed without "scorching." The rate of set-up of the wire insulation stocks was determined by measuring this initial plasticity and their plasticity after one hour and two hours, respectively, in an oven at 212° F. A Goodrich pedestal-type plastometer was used. The procedure was to warm the unvulcanized specimens for 10 minutes at a thickness of 0.250-inch and a temperature of 212° F. between the steam-heated platens of the plastometer. The top platen was then released, and a weight of 10 pounds allowed to act on the specimen. The thickness of the specimen after three minutes was taken as the plasticity of the stock. It is evident that the smaller this value, the softer the stock. The results for the compounds finally chosen are given in Table 1.

TABLE 1. WORKING CHARACTERISTICS

Type	Plasticity: Initial	Plasticity: After 1 Hr. at 212° F. Inch	Plasticity: After 2 Hrs. at 212° F.	Processing Characteristics: On Mill	Processing Characteristics: In Tuber
Natural rubber	0.070	0.048	0.057	Very good	Very good
25% Vistanex M	.059	.053	.134	Very good	Very good
50% Vistanex M	.109	.103	.104	Slightly tough	Very good
Neoprene GN	.046	.161	set up	Slightly tacky	Very good
Neoprene I	.072	.138	set up	Tough and tacky. Gives rough finished stock	Very rough. Difficult to tube
Hycar OR	.068	.094	.145	Good. Gives fairly smooth finished stock	Slightly rough
Chemigum I	.063	set up	set up	Very difficult. Very soft and tacky	Rough
German Perbunan	.185	.168	.165	Somewhat difficult. Slightly tough	Very rough
Domestic Perbunan	.159	.185	.222	Somewhat difficult. Slightly tough	Rough
"Thiokol" RD	.052	.034	.046	Good. Fairly smooth finished stock	Very good
"Thiokol" F	.119	.082	.068	Difficult. Strong odor. Very tacky. Slightly rough	Good
"Thiokol" FA	.086	.057	.073	Somewhat difficult. Tacky. Slightly rough	Very good

The formulas of the insulation compounds are given in Table 2. These data were reported previously,[3] but are being repeated here for convenience.

The formula for the natural rubber stock met all of the above requirements and the requirements for 40% rubber insulation in a government specification.[4]

[4] Bureau of Ships Ad Interim Specification 15C1(INT) of July 1, 1942, [Cables, Electric, Insulated (Shipboard Use)].

Since Vistanex M (Medium) cannot be vulcanized, it was necessary to compound it with natural rubber to produce a practical stock. Two such stocks were prepared.

Considerable experimenting was required to develop 40% wire insulation stocks containing Neoprene Type I and Neoprene Type GN. The neoprenes are naturally "scorchy." It was found that the inclusion of even 2% Altax in the formulas as a retarder did not prevent the stocks from setting up in two hours at 212° F. Litharge instead of magnesia was used in the neoprene stocks in order to diminish water absorption and improve the electrical properties.

All the butadiene copolymer-type stocks were prepared using the same formula. This group includes four Buna N-type rubbers, Hycar OR, Chemigum I, domestic Perbunan, and German Perbunan. "Thiokol" RD, which resembles butadiene copolymer rubbers much more than it resembles the other "Thiokols," was also included in this group. The basic formula was developed using Hycar OR. Except for specific gravity the 40% Hycar OR wire insulation stock complied with all the requirements of the government specification.[4] The other stocks of the group were the same, with the substitution of the respective rubber for Hycar OR, except that no antioxidants were included in the formula of the "Thiokol" Type RD stock.

It should be noted that the stocks were compounded for service as wire insulation, for which mineral pigments must be used. None of the synthetic rubbers exhibits its best mechanical properties when compounded with mineral pigments, and the same is true to a lesser extent with natural rubber. In order to bring out the best abrasion resistance and tear resistance properties of the synthetic rubbers, they must be compounded with fine-particle-size carbon black. Carbon black, of course, is detrimental to the electrical properties of all rubbers, natural and synthetic, unless used in insignificant quantities.

Processing Characteristics of Compounds

As remarked above, the working characteristics are of importance if the compounds are to be applied as wire insulation. Some of these characteristics are listed in Table 1 as observed on a 40-inch mill and in a No. ½ Royle tuber equipped with a wire-insulating head.

TABLE 2. FORMULAS

Constituent	Type: Natural Rubber	25% Vistanex M	50% Vistanex M	Neoprene GN	Neoprene I	Hycar O. R.	Chemigum I	German Perbunan	Domestic Perbunan	"Thiokol" RD	"Thiokol" F	"Thiokol" FA
Smoked sheet (natural rubber)	100.0	75.0	50.0	....	....	....	....	....	....	....	....	....
Vistanex, polybutene medium (Advance Solvents & Chemical Corp.)	....	25.0	50.0	....	....	....	....	....	....	....	....	....
Neoprene Type GN	....	....	....	100.0	....	....	....	....	....	....	....	....
Neoprene Type I	....	....	....	....	100.0	....	....	....	....	....	....	....
Hycar O. R. (Hycar Chemical Co.)	....	....	....	....	....	100.0	....	....	....	....	....	....
Chemigum Type I (Goodyear Tire & Rubber Co.)	....	....	....	....	....	....	100.0	....	....	....	....	....
German Perbunan (Buna N)	....	....	....	....	....	....	....	100.0	....	....	....	....
Domestic Perbunan (Buna N) (Standard Oil Development Co.)	....	....	....	....	....	....	....	....	100.0	....	....	....
"Thiokol" Type RD (Thiokol Corp.)	....	....	....	....	....	....	....	....	....	100.0	....	....
"Thiokol" Type F	....	....	....	....	....	....	....	....	....	....	100.0	....
"Thiokol" Type FA	....	....	....	....	....	....	....	....	....	....	....	100.0
Zinc oxide	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0
Lithiopone	105.0	105.0	105.0	76.0	70.0	75.4	75.4	75.4	75.4	77.4	112.0	112.0
Litharge	....	....	....	15.0	20.0	....	....	....	....	....	....	....
Stearic acid	0.5	0.5	0.5	0.5	1.0	1.0	1.0	1.0	1.0	1.0	0.5	0.5
Paraffin	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	....	....
Neophax A	....	....	....	10.0	....	....	....	....	....	....	....	....
Barrett No. 10 oil	....	....	....	5.0	15.0	....	....	....	....	....	....	....
Latac	....	....	....	0.5	....	....	....	....	....	....	....	....
Dibutylphthalate	....	....	....	....	....	15.0	15.0	15.0	15.0	15.0	....	....
Tricresyl phosphate	....	....	....	....	....	15.0	15.0	15.0	15.0	15.0	....	....
Age Rite Resin D	1.5	1.5	1.5	....	....	1.5	1.5	1.5	1.5	....	....	....
Age Rite White	0.5	0.5	0.5	....	....	0.5	0.5	0.5	0.5	....	....	....
Neozone A	....	....	....	2.0	2.0	....	....	....	....	....	....	....
Altax	....	....	....	2.0	2.0	....	....	....	....	....	0.45	0.45
Santocure	0.45	0.45	0.45	....	....	1.0	1.0	1.0	1.0	1.0	....	....
El Sixty	0.6	0.6	0.6	....	....	0.1	0.1	0.1	0.1	0.1	....	....
Diorthotolylguanidine	....	....	....	....	....	....	....	....	....	....	0.1	0.1
Sulphur	1.15	1.15	1.15	....	1.0	1.5	1.5	1.5	1.5	1.5	....	....

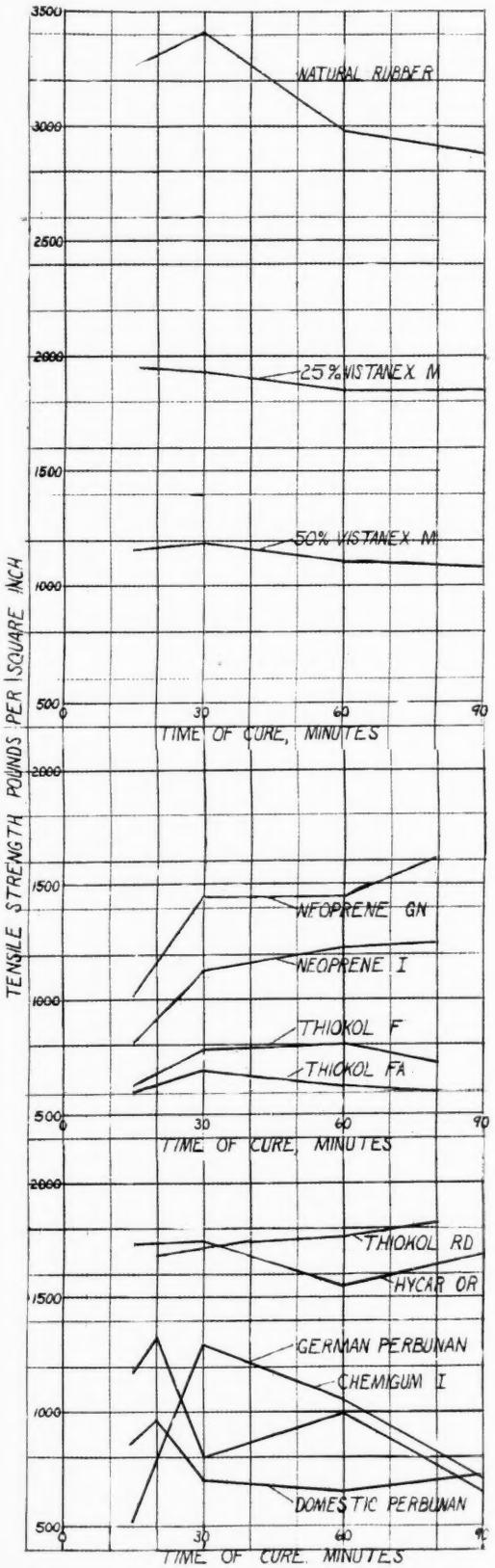


Fig. 1

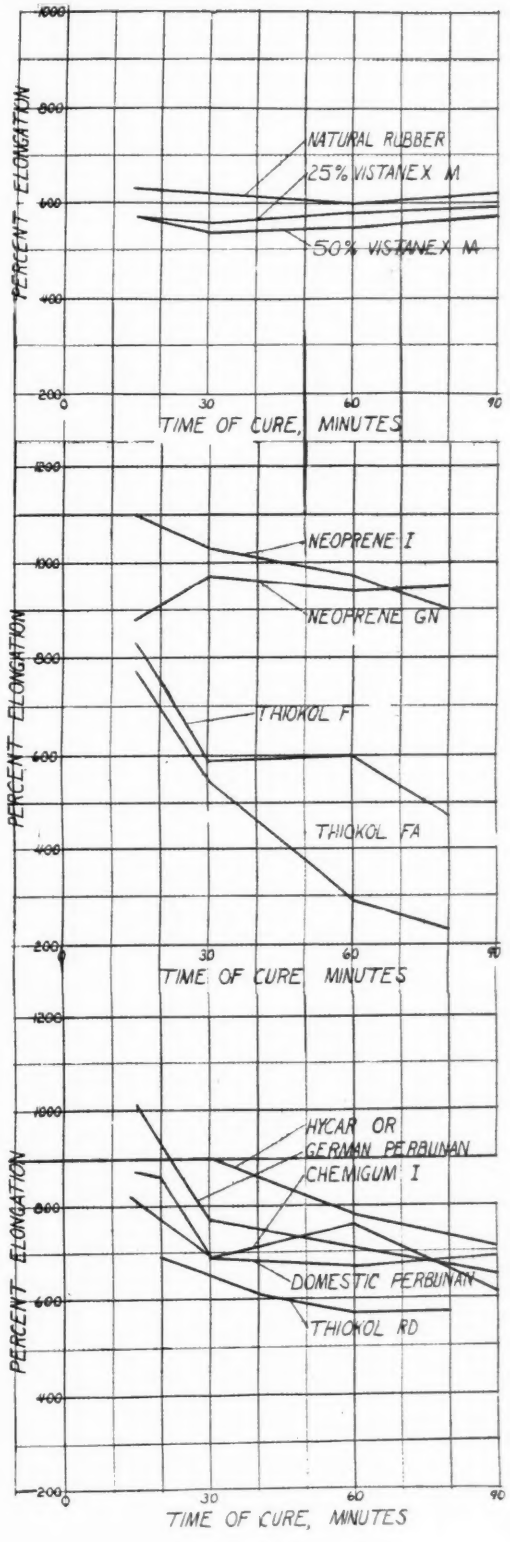


Fig. 2

Substitution of Vistanex M for part of the smoked sheet (natural rubber) toughened the uncured stock. The stocks containing 25% and 50% Vistanex M, however, processed satisfactorily on the mill and in the tuber.

The Neoprene Type GN and Neoprene Type I stocks were definitely "scorchy" and would have to be handled very carefully in a factory. The Neoprene Type GN stock handled fairly well on the mill and in the tuber, but the Neoprene Type I stock was tough and tacky on the mill and tubed very rough.

Of the butadiene copolymer stocks, Hycar OR, "Thiokol" RD, German Perbunan, and domestic Perbunan gave stocks with little tendency to "scorch," but both the Perbunan stocks were quite tough. The Chemigum Type I stock proved very "scorchy" and therefore impractical for factory use. The "Thiokol" Type RD and Hycar OR stocks were the only ones which processed at all satisfactorily; the former stock was the better of the two. It may be pointed out, however, that each rubber must be studied separately if a satisfactory wire insulation stock is desired. It is unreasonable to assume that the same type and amount of softeners and accelerators will work satisfactorily with all of the foregoing butadiene copolymer rubbers since these rubbers differ physically and chemically. Even domestic Perbunan and German Perbunan, which were reported to be the same copolymer of butadiene, do not give stocks with the same properties when compounded in an identical manner.

The "Thiokol" F and "Thiokol" FA stocks exhibited no tendency to "scorch" and were quite soft. They were the most difficult of all the synthetic rubbers to handle on the mixing mill because of their tendency to stick to both mill rolls and because they gave off a very disagreeable gas during the mixing operation. They tubed fairly well however.

Curing Characteristics of Compounds

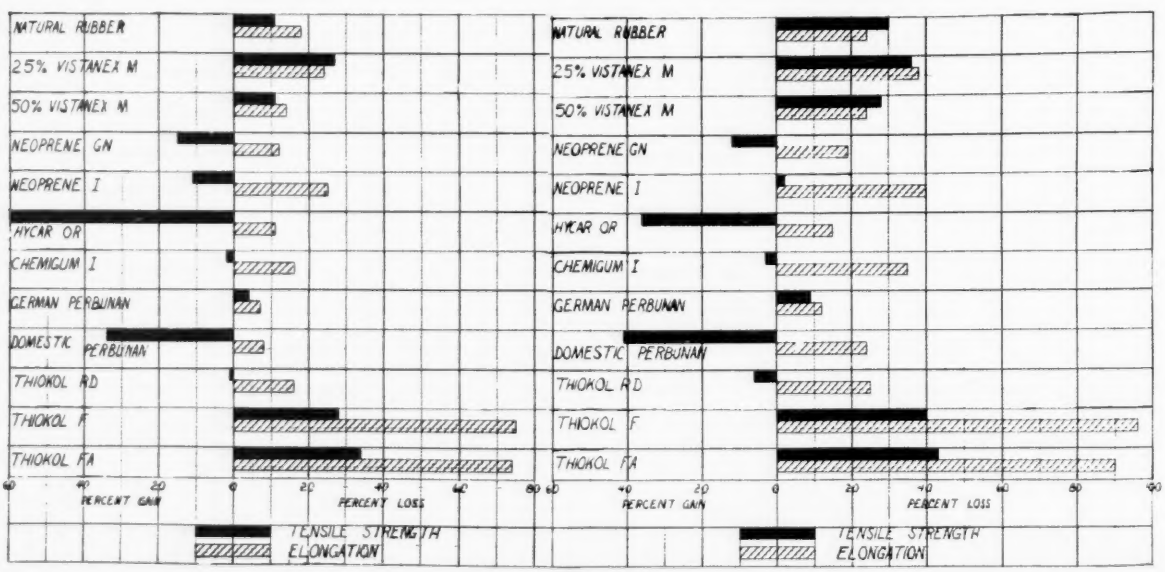
The rates of cure of the stocks, as measured by the variation of tensile strength and ultimate elongation with time of cure, are shown in Figures 1 and 2. All the stocks have a fairly flat curve of tensile strength, although in some cases elongation decreases with time of cure.

From the rate of cure curves, certain times and temperatures were selected as being the best cure for each stock. This curing time and temperature, given in Table 3, were used in preparing all the test sheets except some prepared especially for determining abrasion resistance. The curing time was increased 25% for the abrasion-resistance test pieces because they were thicker than the sheets. It is recognized that the curing temperature for the stocks should have corresponded to from 150 to 250 p.s.i. steam pressure, since, as has been pointed out, these stocks were designed to cure in a continuous vulcanizer. In view of the fact that the curing times at these temperatures would have been very short and therefore difficult to measure accurately, the stocks were cured at lower temperatures where longer curing times could be used. The curing temperatures were approximately the same as the temperatures used in the wire insulation industry for curing in pans or on drums.

TABLE 3. CURES

Type	Sheets: Time Minutes	Sheets: Temperature ° F.	Wire (Temperature 338° F. Pressure 100 p.s.i.)
Natural rubber	30	274	4 min. in live steam
25% Vistanex M	30	274	4 min. in live steam
50% Vistanex M	30	274	4 min. in live steam
Neoprene GN	90	274	10 min. in hot air
Neoprene I	90	274	10 min. in hot air
Hycar OR	30	274	4 min. in live steam
Chemigum I	20	274	2 min. in live steam
German Perbunan	30	274	4 min. in live steam
Domestic Perbunan	20	274	2 min. in live steam
"Thiokol" RD	40	287	7 min. in live steam
"Thiokol" F	40	298	10 min. in hot air cooled under pressure
"Thiokol" FA	40	287	7 min. in hot air cooled under pressure

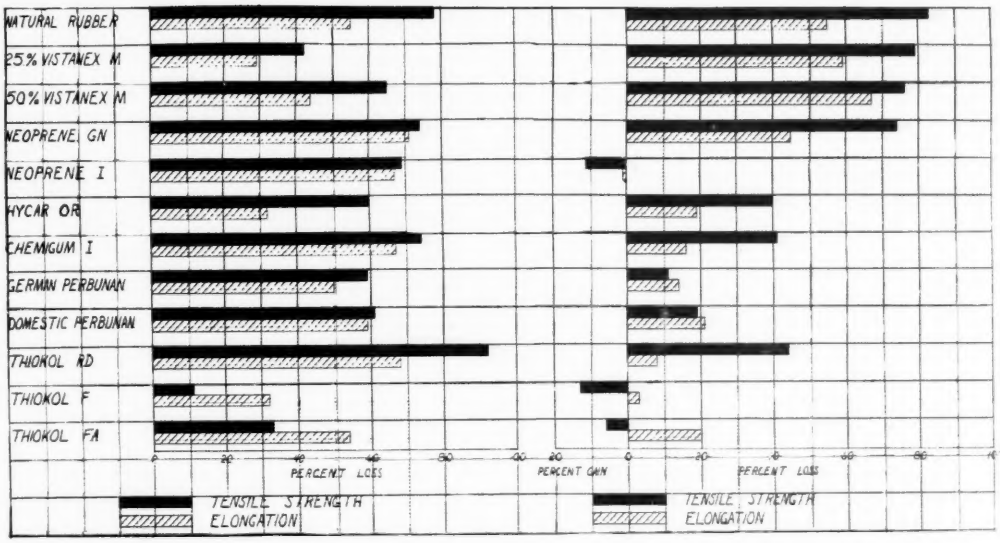
The modern method for curing (vulcanizing) wire insulation is to run the insulated wire directly from the tuber through a long pipe filled with steam at 150 to 250 p.s.i. pressure. A typical arrangement is a wire traveling at a speed of 600 feet per minute through a tube 100 feet long containing steam at 200 p.s.i. pressure. In the absence of the elaborate equipment required for this process, it was necessary to employ a makeshift device. Lengths of insulated #14 copper wire were hung from hooks in a vertical insulated pipe, 40 inches long by six inches in diameter. Steam at 100 p.s.i. pressure was admitted, and the pressure maintained for the length of time required to cure the rubber properly. For curing some of the synthetic rubbers, hot compressed air was used because steam caused them to blow (become porous). The same curing vessel was employed with an internal closed pipe to hold the wires in compressed air at 100 p.s.i. pressure. The "Thiokol" F and "Thiokol" FA stocks became porous even when cured in hot compressed air if the pressure



Change in Tensile Strength and Elongation after 96 Hours at 100° C.

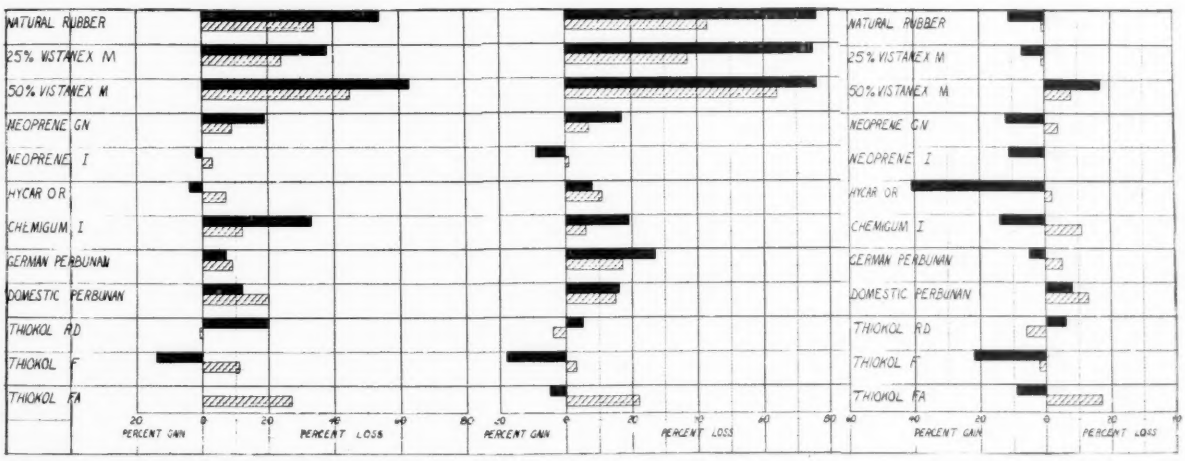
Change in Tensile Strength and Elongation after 192 Hours at 100° C.

Fig. 3



Change in Tensile Strength and Elongation after 24 Hours in Carbon Tetrachloride

Change in Tensile Strength and Elongation after 24 Hours in Turpentine



Change in Tensile Strength and Elongation after 24 Hours in Gasoline

Change in Tensile Strength and Elongation after 24 Hours in Fuel Oil

Change in Tensile Strength and Elongation after 24 Hours in Lubricating Oil

Fig. 4

TABLE 4. PROPERTIES

Type	Specific Gravity	Color	Surface of Wire Insulation	Odor at Temperature 25° C.	50° C.	75° C.	100° C.	Set in 2 Inches after Elongation Inches
Natural rubber	1.64	White	Smooth	Not obj.	Not obj.	Obj.	Obj.	0.05
25% Vistanex M	1.64	White	Smooth	Not obj.	Not obj.	Not obj.	Obj.	.08
50% Vistanex M	1.65	White	Smooth	Not obj.	Not obj.	Obj.	Obj.	.13
Neoprene GN	1.91	Dark gray	Smooth	Not obj.	Obj.	Obj.	Very obj.	.08
Neoprene I	1.95	Black	Rough	Not obj.	Obj.	Very obj.	Very obj.	.06
Hycar OR	1.53	Off white	Rough	Not obj.	Not obj.	Obj.	Obj.	.09
Chemigum I	1.59	Light brown	Rough	Not obj.	Not obj.	Obj.	Obj.	.08
German Perbunan	1.51	Off white	Extremely rough	Not obj.	Not obj.	Obj.	Obj.	.05
Domestic Perbunan	1.49	Off white	Extremely rough	Not obj.	Not obj.	Obj.	Obj.	.06
"Thiokol" RD	1.58	Light gray	Smooth	Not obj.	Not obj.	Obj.	Very obj.	.05
"Thiokol" F	2.28	White	Smooth	Not obj.	Obj.	Very obj.	Very obj.	.06
"Thiokol" FA	2.27	White	Smooth	Not obj.	Obj.	Obj.	Very obj.	.07
Gov. Spec. 15C1 (INT)	1.46 min.	.....	.....	.....	.....	.....	.....	.25 max.

TABLE 5. AGING—OXYGEN BOMB. 70° C., 300 P.S.I.

Type	Tensile Strength, p.s.i. Initial	48 Hrs.	96 Hrs.	144 Hrs.	Elongation, % Initial	48 Hrs.	96 Hrs.	144 Hrs.	Modulus, p.s.i. Initial	48 Hrs.	96 Hrs.	144 Hrs.
Natural rubber	2830	2820	2670	2620	580	560	550	600	410	500	460	430
25% Vistanex M	1910	1850	1890	1830	550	540	530	550	380	420	440	420
50% Vistanex M	1090	1050	1000	950	530	520	500	540	350	360	370	340
Neoprene GN	1620	1590	1420	1520	940	960	940	990	180	230	240	200
Neoprene I	1300	1280	1180	1190	830	830	800	790	300	360	370	390
Hycar OR	1670	1890	2250	1590	700	740	730	700	120	130	120	100
Chemigum I	900	790	1140	1010	770	680	710	670	100	130	110	130
German Perbunan	1300	1100	720	710	690	670	590	600	150	160	160	150
Domestic Perbunan	650	480	780	930	720	620	690	680	100	110	100	100
"Thiokol" RD	2080	1970	2110	2120	570	590	550	540	190	190	210	210
"Thiokol" F	770	740	780	730	510	590	600	600	480	400	410	400
"Thiokol" FA	760	750	690	520	550	650	640	550	430	380	360	300
Gov. Spec. 15C1 (INT)	1500	1200	900	....	450	....	....	....	....	....	....	....

was released immediately at the end of the cure. It was necessary to cure the wires insulated with these "Thiokol" stocks in hot compressed air followed by cold compressed air in order to cool them under pressure. Major equipment changes would probably be required in a factory if these stocks were used for insulating wires.

The conditions used for curing both sheets and wires are listed in Table 3.

Most of the tests were carried out on material in the form of slabs approximately 0.08- to 0.09-inch thick. Some of the measurements of abrasion resistance were made on slabs somewhat thicker. A few tests were made on #14 copper wires insulated with about 0.05-inch of the various compounds.

Basic Physical Properties of Compounds

Appearance. The color of the stocks and surface finish of the wire specimens are listed in Table 4.

Odor. The amount of objectionable odor from the samples was approximated by corking small pieces in test tubes for two hours at various temperatures, after which they were uncorked and rated by several observers. The results are also summarized in Table 4.

Specific Gravity. The specific gravities of the stocks, given in Table 4, varied considerably, and many did not meet the government specification.[4] This fact is not considered important since the specific gravities of the raw rubbers vary widely.

Tensile Strength. The tensile strengths are given in Table 5. The tensile strength of the natural rubber stock is considerably higher than that of the synthetic rubber stocks. Several of the latter did not meet the government specification.[4]

Ultimate Elongation to Rupture. The elongations are also given in Table 5. The neoprenes and several of the butadiene copolymers were better than natural rubber in this respect. All of the stocks met the requirement of the government specification.[4]

Tensile Modulus at 200% Elongation. The modulus at 200% elongation is used as a convenient measure of hardness since the latter property is difficult to determine on wire insulation. A hard wire insulation stock is usually desirable since it resists crushing better than a soft stock. Only the "Thiokol" Type F and Type FA stocks exceeded the initial modulus of the natural rubber stock. The results are shown in Table 5.

Permanent Set After Elongation. The values of the set are given in Table 4. All of the stocks met the requirement of the government specification.[4]

Crescent Tear. The results of the crescent tear test are given in Table 6. Good tear resistance is of secondary importance for a wire insulation stock. The natural rubber stock had by far the best tear resistance; while the butadiene copolymer stocks were particularly poor in this respect.

Table 6.

Type	Crescent Tear Pounds per 0.1-Inch Thickness	Hardness (Specimens ¼-Inch Thick) Pusey & Jones	A.S.T.M.	Shore
Natural rubber	36.4	1.11	54	45
25% Vistanex M	21.0	1.11	55	45
50% Vistanex M	11.1	1.26	66	43
Neoprene GN	15.4	1.75	98	35
Neoprene I	11.2	1.03	49	48
Hycar OR	5.4	1.51	88	33
Chemigum I	6.1	1.42	95	35
German Perbunan	5.3	1.32	80	37
Domestic Perbunan	3.8	1.70	114	31
"Thiokol" RD	8.6	1.23	75	41
"Thiokol" F	18.3	.66	19	64
"Thiokol" FA	15.4	.65	27	60

Hardness. Hardness was determined by three methods: Pusey & Jones, A.S.T.M., and Shore. The results, which are fairly concordant, are given in Table 6.

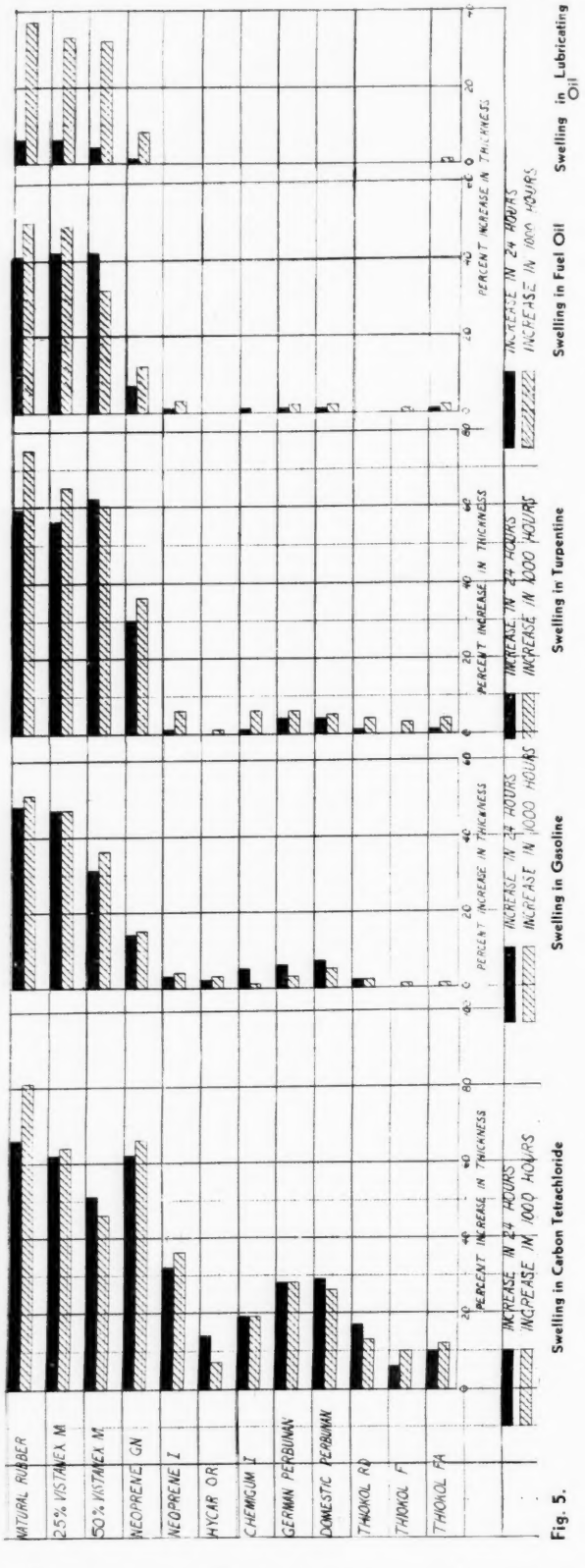


Fig. 5.

Deterioration. The stocks were exposed to various influences including light, heat, compressed oxygen, organic solvents, sea water, and sulphuric acid. The effects

(Continued on page 170)

Naftolen in Carbon Black Compounds Containing Reclaim

Fritz Rostler and Kathleen Rostler[1]

THE influence of Naftolen in carbon black compounds formulated with crude rubber alone has been reported.[2] It was shown in a series of mixtures based on a tire tread compound to what extent this material can be used as an extender for crude rubber and how the physical properties are affected by varying the formulation. The primary purpose of the present study is to investigate the quantitative decrease of some of the more important mechanical properties of the same-type compound, brought about by replacing the crude rubber with increasing amounts of whole tire reclaim. Mixtures without Naftolen were also included for comparison.

Basically the same series and method of investigation as in the previous study were used, and the reclaim compounds investigated were compared with analogous crude rubber compounds.

Variation of Plasticizer Content

First a series of mixtures was tested in which 50 parts of the crude rubber in the mixtures of the previous examination were replaced by 100 parts of whole tire reclaim, which contained 50% of rubber hydrocarbons. Table 1 (Series A) shows the composition and test data of a series of mixtures with increasing amounts of Naftolen and pine tar, respectively. Figure 1 compares the physical data for these mixtures with the physical data for the crude rubber compounds of the earlier study.

These graphs show that the addition of Naftolen or pine tar to the reclaim-containing compound has the same general effect as with the crude compound, but that with all properties the change with increasing content is less abrupt. It is especially noteworthy that all the graphs for Naftolen are, throughout the range of appreciable effectiveness, in both cases straight lines, showing that the function of Naftolen as a true extender (as defined in the earlier report)[2] holds for a reclaim-containing compound as well as for one containing only crude rubber. The abrasion resistance of the Naftolen-containing compounds is again appreciably better than that of the pine tar compounds.

In comparing the two pine-tar series by themselves it is interesting to note that the abrasion resistance of the reclaim-containing compounds is higher than that of the crude rubber compounds, in the range of high pine-tar content. This is in correlation with the fact that the hardness decreases more slowly in reclaim compounds with increasing pine-tar content in this upper range. A comparison of the results for abrasion resistance of the two Naftolen series shows that there is very little difference between the reclaim and crude rubber compounds throughout the investigated range. The graphs for resilience show that for reclaim-containing mixtures as well as for the crude rubber mixtures the resilience is unaffected by increasing the Naftolen content; whereas the pine tar decreases the resiliency in proportion to the amount added.

Variation of Carbon Black Content

In Table 2 (Series B) the influence of varying the amount of carbon black in Mixture 4 of Series A is shown. Figure 2 compares the physical data graphically with the data for the analogous crude rubber mixtures. The significant point of this comparison is that the curves for all the properties investigated, except hardness, are much flatter with the reclaim-containing series than with the reclaim-free series. This is probably due to the filler content of the reclaim itself. The influence of the original filler content is most obviously shown in the curve for abrasion, where up to about 30 parts added carbon black the abrasion index is better for the reclaim-containing compounds. However the fact that a low point in the abrasion for both series lies at about 65 parts of carbon black may be taken as an indication that the original carbon-black content of the scrap has lost most of its reenforcing quality during the reclaiming process. Thus to obtain optimum abrasion resistance it seems necessary to add the same amount of virgin carbon black to reclaim-containing mixtures as to crude rubber compounds.

Sulphur Content Variation in Compounds

Naftolen, like rubber, is an unsaturated hydrocarbon and therefore requires sulphur (3% to 6% based on the

[1] Wilmington Chemical Corp., 10 E. 40th St., New York, N. Y.

[2] "Naftolen as a Plasticizer and Extender for Rubber in Carbon Black Compounds", Fritz Rostler and Vilma Mehner, INDIA RUBBER WORLD, Feb., 1942, pp. 473-77.

TABLE 1. SERIES A

Compound No.	1	2	3	4	5	6	7	8	9
Smoked sheets	50.	50.	50.	50.	50.	50.	50.	50.	50.
Whole tire reclaim	100.	100.	100.	100.	100.	100.	100.	100.	100.
Stearic acid	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Sulphur	3.2	3.2	3.5	4.	4.5	3.2	3.5	4.	4.5
Naftolen R-100	...	8.	15.	30.	50.	...	...	...	...
Pine tar	...	...	...	...	...	8.	15.	30.	50.
Channel black	55.	55.	55.	55.	55.	55.	55.	55.	55.
Zinc oxide	5.	5.	5.	5.	5.	5.	5.	5.	5.
Captax	1.	1.	1.	1.	1.	1.	1.	1.	1.
Optimum cure at 35# (Min.)	45	45	45	45	45	45	45	45	45
Test Results									
Sp. gr.	1.219	1.209	1.208	1.197	1.182	1.212	1.214	1.205	1.203
Hardness (Shore)	79	78	76	71	65	79	80	79	74
Stress strain (@ 300% (psi)	1780	1510	1300	1200	910	1430	1360	1050	710
Stress strain (@ 500% (psi)	...	...	...	...	...	...	...	1890	1370
Tensile (@ break (psi)	2340	2320	2150	1980	1600	2300	2040	1890	1370
Elongation (@ break (%)	380	390	440	467	490	487	460	530	510
Abrasion (du Pont abrader, Norton wheel 46 I)	192	216	233	288	353	255	274	371	548
Resilience—Luepke									
1st impact	57	55	54	54	54	54	53	50	45
2nd impact	34	31	31	30	31	30	29	26	22
3rd impact	21	18	17	17	18	16	15	13	11
4th impact	12	10	10	9	11	9	8	7	5
5th impact	7	6	5	6	6	5	5	4	3
6th impact	4	4	3	4	4	3	3	2	2
7th impact	2	3	2	3	3	2	2	1	1
8th impact	1	2	1	2	2	1	1	....	....

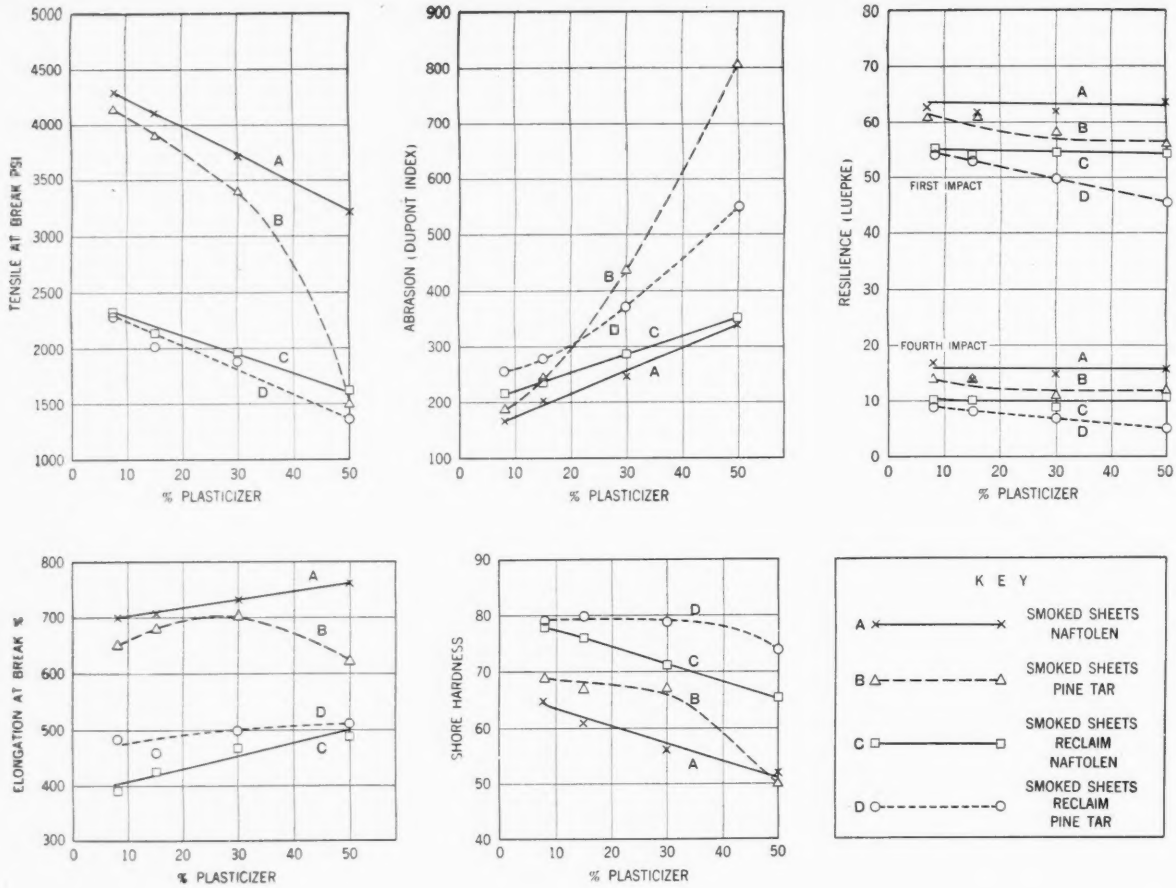


Fig. 1. Series A

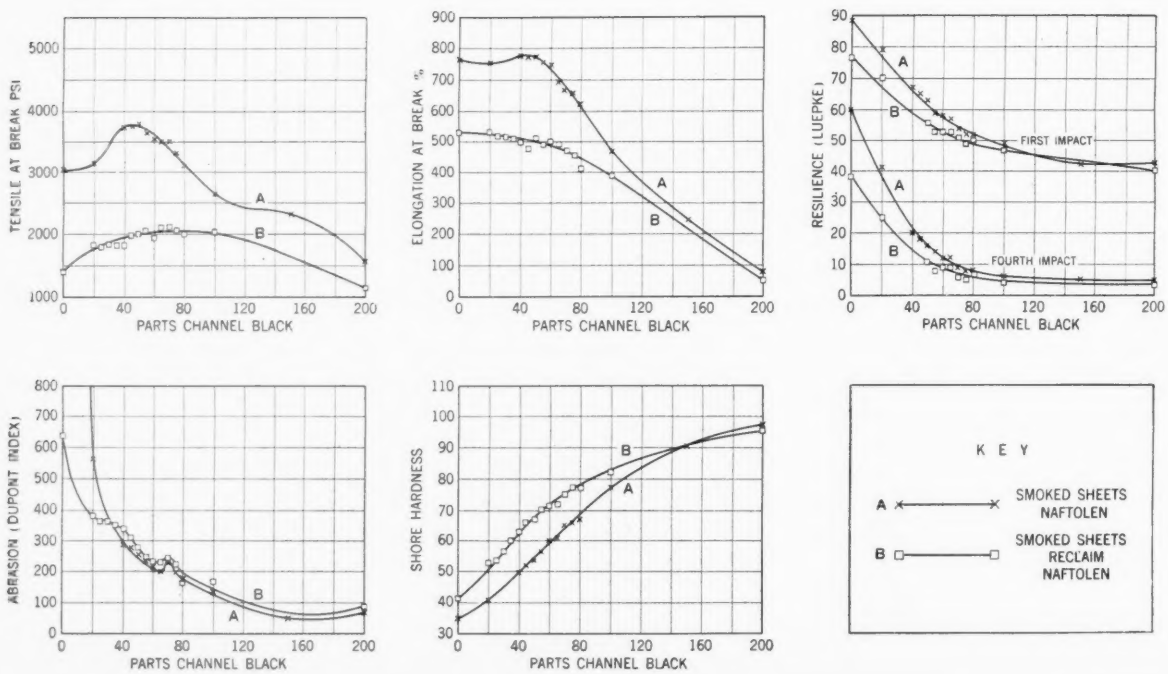


Fig. 2. Series B

TABLE 2. SERIES B

Compound No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Smoked sheets	50.	50.	50.	50.	50.	50.	50.	50.	50.	50.	50.	50.	50.	50.	50.	50.
Whole tire reclaim	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
Stearic acid	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Sulphur	4.	4.	4.	4.	4.	4.	4.	4.	4.	4.	4.	4.	4.	4.	4.	4.
Naftolen R-100	30.	30.	30.	30.	30.	30.	30.	30.	30.	30.	30.	30.	30.	30.	30.	30.
Channel black	..	20.	25.	30.	35.	40.	45.	50.	55.	60.	65.	70.	75.	80.	100.	200.
Zinc oxide	5.	5.	5.	5.	5.	5.	5.	5.	5.	5.	5.	5.	5.	5.	5.	5.
Captax	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
Optimum cure at 35° (Min.)	25	35	35	35	35	45	45	45	45	45	45	45	45	45	45	60
Test Results																
Sp. gr.*	1.091	1.129	1.148	1.158	1.167	1.175	1.173	1.186	1.201	1.201	1.216	1.221	1.231	1.240	1.266	1.339
Hardness (Shore)	41	53	54	57	60	63	66	67	70	71	72	75	77	77	82	95
Stress strain @ 300% (psi)	410	750	730	780	910	980	1100	1140	1160	1180	1250	1350	1350	1530	1710	.....
Stress strain @ 500% (psi)	1370	1650	1640	1710	1730	1820	....	1980	....	1960	....	....	....	....	....	.....
Tensile @ break (psi)	1410	1820	1810	1850	1820	1820	1980	2020	2060	1960	2090	2100	2040	2000	2040	1260
Elongation @ break	530	530	520	520	510	500	480	510	490	500	490	470	460	410	387	60
Abrasion (du Pont abrader, Norton wheel 46 I)	633	379	362	361	351	336	308	278	246	233	229	244	222	163	168	86
Resilience—Luepke																
1st impact	77	70	Not	Not	Not	Not	Not	56	53	53	53	51	49	50	47	40
2nd impact	60	50						33	29	30	30	26	24	26	21	16
3rd impact	48	35	Test-	Test-	Test-	Test-	Test-	19	16	16	17	13	12	14	9	6.5
4th impact	38	25						11	8	9	9	6	5	7	4	3
5th impact	31	18	ed	ed	ed	ed	ed	7	4	5	5	3	2.5	3.5	1.5	1.5
6th impact	25	13						4	2	2.5	3	1.5	1.5	1.5	0.5	.....
7th impact	20	9						2.5	1	1.5	1.5	0.5	0.5	1	.....	.....
8th impact	17	7						1.5	0.5	....	1.	.....	.....	.....	.....	.....

Naftolen has been found to be the optimum quantity if 4% to 2% is used on the rubber). Thus as in the earlier study on crude rubber compounds, a series (C) was tested in which the sulphur content was varied in the mixture containing 65 parts of carbon black (Mixture 11 of Series B). From the data shown in Table 3, considering all the properties, four parts of sulphur is the proper proportion. The improvement in abrasion resistance with increased sulphur is obviously due to the increased hardness of the compound.

TABLE 3. SERIES C

Compound No.	1	2	3	4	5
Smoked sheets	50.	50.	50.	50.	50.
Whole tire reclaim	100.	100.	100.	100.	100.
Stearic acid	1.5	1.5	1.5	1.5	1.5
Sulphur	3.5	3.8	4.	4.5	5.
Naftolen R-100	30.	30.	30.	30.	30.
Channel black	65.	65.	65.	65.	65.
Zinc oxide	5.	5.	5.	5.	5.
Captax	1.	1.	1.	1.	1.
Optimum cure at 35° (Min.)	45	45	45	45	35
Test Results					
Sp. gr.	1.217	1.203	1.216	1.211	1.219
Hardness (Shore)	72	72	72	75	75
Stress strain @ 300% (psi)	1200	1150	1250	1330	1300
Tensile @ break (psi)	1980	2000	2090	2070	2140
Elongation @ break (%)	470	480	490	450	420
Abrasion (du Pont abrader, Norton wheel 46 I)	343	265	229	223	218
Resilience					
1st impact	50	52	53	53	53
2nd impact	26	28	30	29	29
3rd impact	14	15	17	15	16
4th impact	7	7	9	8	8
5th impact	4	4	5	5	5
6th impact	2	3	3	3	3
7th impact	1	2	1.5	2	2
8th impact	..	1	1	1	1

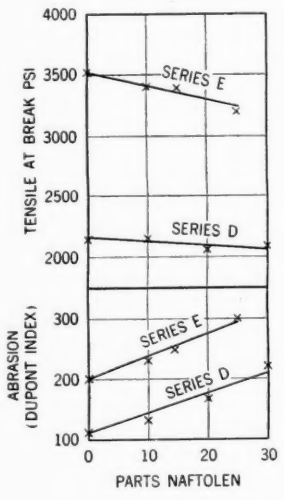


Fig. 3. Series D and E

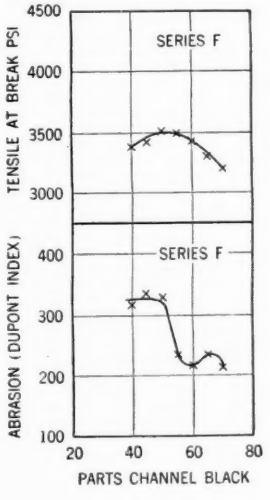


Fig. 4. Series F

Variation of the Reclaimed Rubber Content

The next three series, D, E, and F (Table 4) were designed to check the characteristic trend of curves for compounds containing reclaim, carbon black, and Naftolen, but employing different proportions from those formerly used. Series D is based on 50 parts smoked sheets, 100 parts reclaim, and 65 carbon black; while Series E contains 100 parts of smoked sheets, 25 parts of reclaim, and 55 parts of carbon black. In both series the amount

TABLE 4

	SERIES D				SERIES E				SERIES F						
Compound No.	1	2	3	4	1	2	3	4	1	2	3	4	5	6	7
Smoked sheets	50.	50.	50.	50.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
Whole tire reclaim	100.	100.	100.	100.	25.	25.	25.	25.	25.	25.	25.	25.	25.	25.	25.
Stearic acid	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Sulphur	4.5	4.5	4.5	4.5	4.	4.	4.	4.	4.	4.	4.	4.	4.	4.	4.
Naftolen R-100	..	10.	20.	30.	..	10.	15.	25.	20.	20.	20.	20.	20.	20.	20.
Channel black	65.	65.	65.	65.	55.	55.	55.	55.	40.	45.	50.	55.	60.	65.	70.
Zinc oxide	5.	5.	5.	5.	5.	5.	5.	5.	5.	5.	5.	5.	5.	5.	5.
Captax	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
Optimum cure @ 35° (Min.)	45	35	35	35	35	35	35	35	25	35	35	35	35	35	35
Test Results															
Sp. gr.	1.233	1.230	1.215	1.211	1.158	1.148	1.141	1.135	1.114	1.122	1.132	1.140	1.161	1.163	1.175
Hardness (Shore)	84	80	77	75	71	69	66	64	55	59	60	63	67	68	70
Stress strain @ 300% (psi)	..	1780	1560	1270	1470	1170	1060	840	660	700	850	930	1140	1150	1220
Stress strain @ 500% (psi)	..	...	...	...	2980	2460	2240	1940	1590	1650	1960	2100	2420	2390	2410
Tensile @ break (psi)	2130	2160	2040	2080	3510	3400	3400	3200	3400	3420	3520	3490	3430	3300	3190
Elongation @ break (%)	270	390	420	460	573	620	643	690	733	730	720	680	660	640	623
Abrasion (du Pont abrader, Norton wheel 46 I)	111	134	164	220	200	229	249	299	319	336	331	236	216	234	212

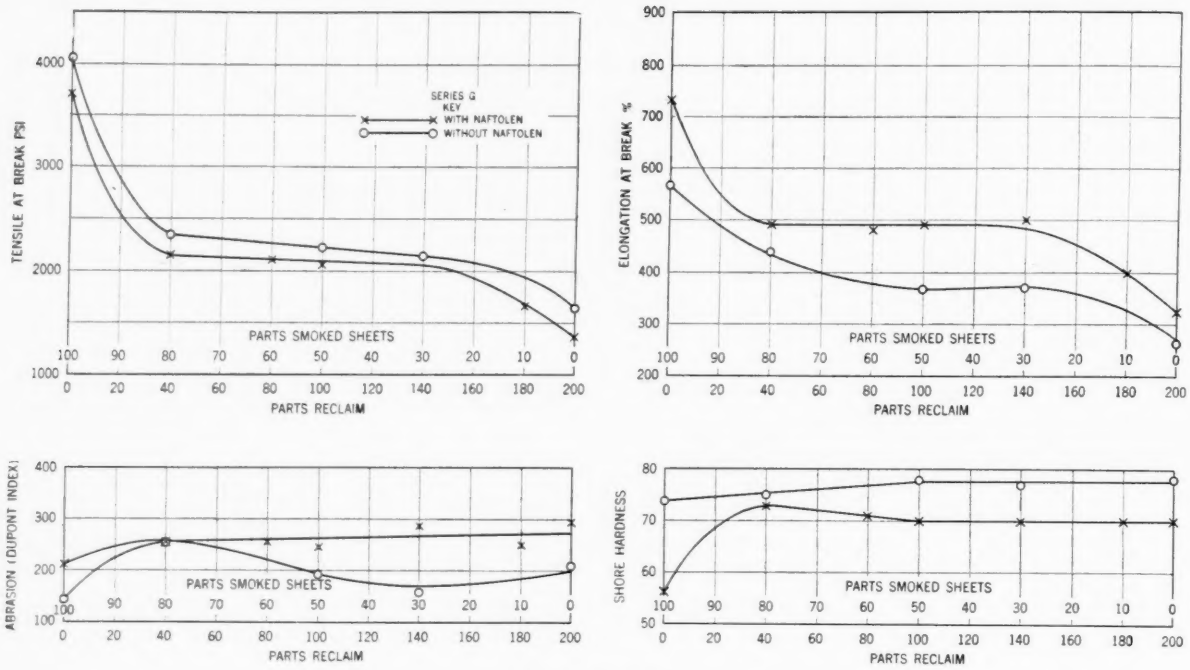


Fig. 5. Series G

TABLE 5. SERIES G

Compound No.	1	1a	2	2a	3	4	4a	5	5a	6	7	7a
Smoked sheets	100.	100.	80.	80.	60.	50.	50.	30.	30.	10.	....	....
Whole tire reclaim	....	....	40.	40.	80.	100.	100.	140.	140.	180.	200.	200.
Stearic acid	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Sulphur	4.	3.	4.	3.	4.	4.	3.	4.	3.	4.	4.	3.
Naftolen R-100	30.	....	37.	....	30.	30.	....	35.	....	30.	30.	....
Channel black	55.	55.	55.	55.	55.	55.	55.	55.	55.	55.	55.	55.
Zinc oxide	5.	5.	5.	5.	5.	5.	5.	5.	5.	5.	5.	5.
Agerite Powder	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Captax	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
Optimum cure @ 35# (Min)	25	35	45	45	45	45	25	45	45	45	45	45
Test Results												
Sp.gr.	1.133	1.152	1.211	1.217	1.192	1.201	1.218	1.192	1.237	1.234	1.236	1.266
Hardness (Shore)	56	74	73	75	71	70	78	70	77	70	70	78
Stress strain @ 500% (psi)	710	1830	1280	1640	1270	1160	1840	1210	1780	1300	1270	....
Stress strain @ 500% (psi)	1850	3560	....	....	....	....	....	2140	....	....	....	....
Tensile @ break (psi)	3700	4050	2140	2350	2100	2060	2200	2140	2140	1650	1350	1650
Elongation @ break (%)	737	563	490	437	480	490	370	500	370	400	340	260
Abrasion (du Pont abrader, Norton wheel 46 D)	216	148	254	254	255	245	192	286	149	250	297	209

TABLE 6. SERIES H

Compound No.	1*	2	3	4	5	6	7*	8	9	10*
Smoked sheets	100.	98.	97.	92.	95.	90.	50.	....	4.	....
Whole tire reclaim	....	4.	6.	16.	10.	20.	100.	200.	192.	200.
Stearic acid	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Sulphur	4.	4.	4.2	3.2	4.	4.	4.	3.2	3.6	4.
Naftolen R-100	30.	30.	40.	8.	30.	30.	30.	8.	20.	30.
Channel black	55.	55.	55.	55.	55.	55.	55.	55.	55.	55.
Zinc oxide	5.	5.	5.	5.	5.	5.	5.	5.	5.	5.5
Agerite Powder	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.
Captax	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
Tensile @ break (psi)										
Predicted	3750	3600	3300	3600	3300	3000	2070	1620	1600	1350
Measured	3570	3490	3100	3540	3140	2840	1870	1430	1350	1100
Corrected (measured plus 200)	3770	3600	3300	3740	3340	3040	2070	1630	1550	1300

*Control mixtures repeated from Series G (mixtures 1, 4, and 7).

of Naftolen was varied. The third series, F, was formulated with 100 smoked sheets, 25 reclaim, and 20 parts of Naftolen, with the carbon black varied. The test data for Series D and E are plotted in Figure 3; while results of F are shown in Figure 4. The results obtained confirm the fact that the curves for all such compounds follow the same pattern.

The conclusion which can be drawn from these findings is that a great regularity prevails in carbon black compounds containing Naftolen in amounts higher than eight parts, whether the rubber hydrocarbon employed comes from crude rubber or reclaim.

To determine how the physical properties change on gradually replacing crude rubber, the compounds of Series G (Table 5) were investigated with Figure 5 showing the data of these tests. In this series a comparison between Naftolen-free and Naftolen-containing mixtures was included. Whether Naftolen is used or not, the characteristic feature of the curves for tensile and elongation is that the replacement of 20 parts of the smoked sheets with reclaim causes a tremendous drop in the tensile and elongation, but that further replacement, up to 70 parts, results in very little change in the tensile and elongation. The influence on the hardness and abrasion follows the

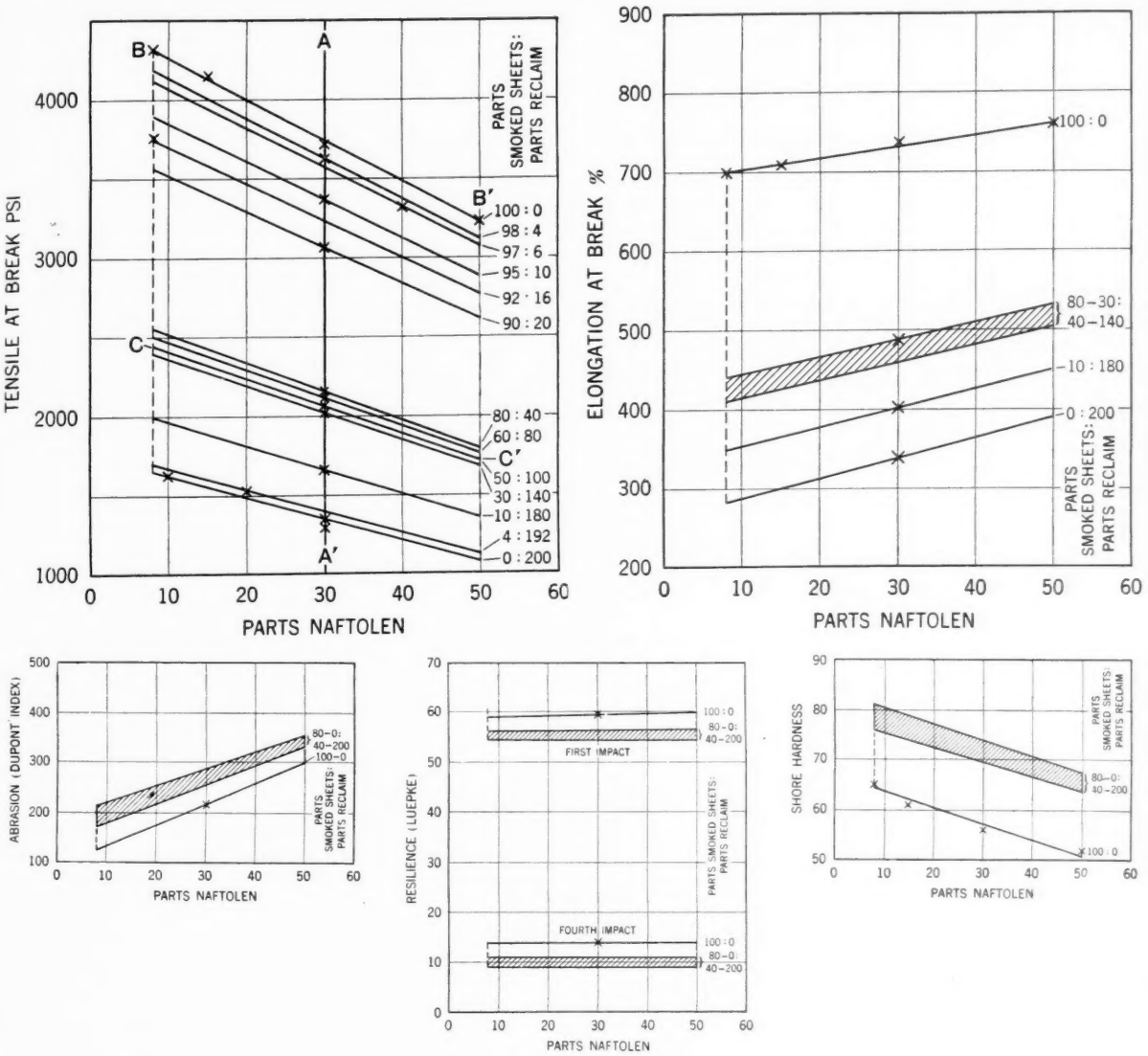


Fig. 6. Series H

same trend. The resiliency is affected very little throughout the entire range of replacement as shown in Figure 6. From these results, therefore, it would appear that there is practically no difference in the physical properties investigated, whether 20 parts or 70 parts of crude rubber are replaced by the hydrocarbon of reclaimed rubber in compounds with appreciable carbon black loadings. Other properties, such as resistance to tear and flex cracking and heat build up which have not been reported in the present study, might bring out characteristic differences in these compounds.

Graphic Method for Prediction of Properties

The results of the earlier study on crude rubber-carbon black compounds showed that the physical properties of a channel black-loaded compound change in direct proportion to the amount of Naftolen used as an extender in the investigated range (8 to 70 parts on 100 parts of rubber). The present study has shown that this linear functionality also holds for crude rubber-reclaim combinations if the rubber hydrocarbon content is kept constant. This simple geometric relation offers the possibility of predicting properties brought about by varying the ratio of hydrocarbon components (e.g., crude rubber, reclaim, and Naftolen), and also, *vice versa*, of determining the possible combinations of hydrocarbons for a given value of any physical property. In Figure 6 are illustrated charts for this type of prediction of properties for varying combinations of smoked sheets, reclaim, and Naftolen in the following compound:

Smoked sheets	X
Whole tire reclaim	Y
Naftolen R-100	Z
Stearic acid	1.5
Carbon black	55.
Zinc oxide	5.
Agerite Powder	1.5
Sulphur	3% of $(X + \frac{1}{2}Y + Z)$
Captax	1.

The chart for tensile plotted against parts Naftolen on 100 parts rubber hydrocarbon was made up in the following manner. The tensile of all compounds of Series G containing 30 parts Naftolen taken from Figure 5 were plotted along the line AA'. The slopes of the line BB' for 100 smoked sheets and of the line CC' for 50 smoked sheets—100 reclaim were taken from Figure 1. Lines BB' and CC' were continued to a point of con-

vergence off the chart. The slopes of the lines through all other points in *AA'* (from Figure 5) were determined by connecting the point of convergence with these points. In order to check the accuracy of this method of determining the slope of the curve and to determine the position of the lines representing compositions between 100 smoked sheets and 80 smoked sheets a supplementary series was set up (Table 6, Series H), and the tensile strength for these mixtures predicted as given in Table 6. Mixtures 1, 7, and 10 of this series are control mixtures, identical with Mixtures 1, 4, and 7 of Series G. Because new lots of reclaim and rubber were used, the experimental values for tensile strength of Mixtures 1, 7, and 10 were not identical with those in Series G, but were all about 200 pounds per square inch lower. Since Series G was the basis for the chart, all the figures for tensile strength of the mixtures in Series H were plotted 200 pounds per square inch higher on the chart. The corrected figures are also given in Table 6.

The charts for the other properties were set up in a similar manner. The properties other than tensile strength reported in Series G fall in such a narrow range in comparison with the experimental error in measurements that drawing separate lines for individual points would not be justified in all cases. A close range is therefore represented in the charts by shaded areas rather than individual lines. It is obvious that similar charts can be constructed for many variations in compounding other than those covered in the article. It should be mentioned in this connection that the excellent method of trilinear compounding proposed by D. B. Forman[3] is more generally applicable and provides a means of reading more than one property from a single chart.[4] The graphic method described in the present article, however, is simpler to employ and requires only a very few measurements. A chart as presented in Figure 6 can be constructed with a reasonable degree of accuracy from as few as 10 or 12 points.

As to practical use of the method suggested, the authors wish to emphasize that only an approximate composition can be selected, and it is necessary to make the composition selected from the chart a starting point for developing the final formula. Great care has to be taken that the raw materials for series of tests of this kind are used from one lot, or, if that is not possible, some mixtures have always to be repeated in every new series of tests in order to bring the results to the same level.

[3] *Rubber Age (N. Y.)*, Dec., 1941, p. 191.

[4] A chart for tensile strength and elongation based on trilinear compounding is shown in Figure 7. The points in this figure are taken from Figure 6, which provides an unlimited number of points. The variables *A*, *B*, and *C* are as follows: *A* is a straight smoked sheets compound, Mixture 1a in Table 5; *B* is a straight reclaim compound, Mixture 7a in Table 5; and *C* is Naftolen plus 3% sulphur. The position of the points in this chart has been determined from the percentage by volume of each of these three components in the compounds.

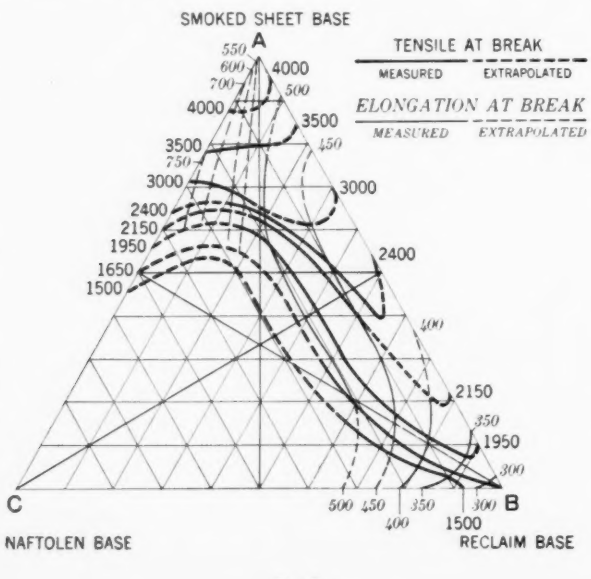


Fig. 7

Conclusion

Based on a previous investigation of the behavior of Naftolen in carbon black compounds made with crude rubber, series of mixtures were tested containing whole tire reclaim as a portion of the rubber hydrocarbons. It was found that the same general rules of compounding are applicable. It was further found that in replacing crude rubber by reclaimed rubber hydrocarbons, a considerable drop in tensile and elongation occurs when 20 parts of crude rubber are replaced, but a further replacement of up to 70 parts influences these physical properties exceptionally little. It is interesting to see that the abrasion resistance is very little influenced by replacement of crude rubber by reclaimed rubber hydrocarbons throughout the whole range. There are indications from the variation of abrasion with carbon black loading in a reclaim-containing compound that the filler content of the reclaim itself has lost its reenforcing properties, and that for obtaining highest resistance to abrasion the same amount of new carbon black has to be added as to a compound containing crude rubber alone. All other physical properties of these compounds measured are much less affected by changes in carbon black loading than the properties of corresponding compounds based on smoked sheets alone.

A graphic method has been presented for determining the properties of any combination of smoked sheets-reclaim-Naftolen in a basic carbon black compound.

In the above discussion physical properties such as tensile strength, elongation, abrasion, hardness, and resilience have been considered. Other very important properties, such as resistance to tear, to flex cracking and to heat build up, have also to be determined for full evaluation of compounds of this type. Essential, in addition to any preliminary study such as the present, is at least a close observation of the appearance of the cured as well as the uncured stock. From the freshly cut surface of a test slab the uniformity of a stock can clearly be seen. Tear resistance tested by hand and the permanent elongation tested by pulling a thin strip by hand, and similar hand tests known to rubber technologists for many years should be applied to all test samples, particularly reclaim compounds, to get a more complete picture of the nature of the compound.

The experimental work reported in this article was carried out in V. L. Smithers Laboratories.

Last Installment of Drogin Article Postponed

We regret to announce that because of circumstances that were unavoidable the third and last installment of the article by I. Drogin on "Study of Carbon Blacks in Natural and Synthetic Rubbers" must be postponed until our December issue. This final installment will cover the results of work on the effect of lampblack and acetylene black; the effect of three different types of black in a Buna S tread compound; all blacks in natural and synthetic rubbers; and the effect of natural rubber or reclaim when blended with synthetic rubbers.

Nitroparaffins in the Rubber Industry

A. W. Campbell[1] and J. W. Burns[2]

A RECENT development in the field of industrial chemicals which has met with widespread interest is the first commercial production of the nitroparaffins in 1940. The announcement of the nitroparaffins to the industry was followed by extensive investigations in industrial and research laboratories of the suitability of these compounds in a wide variety of applications, including many in the field of rubber technology. It is the purpose of this paper to summarize the more promising applications of the nitroparaffins in the rubber industry which have so far been reported.

Application as Rubber Solvents

Among the first successful applications of the nitroparaffins was their use in solvent formulation. Extensive tests by the research department of Commercial Solvents Corp. and others, showed that the nitroparaffins and their derivatives act as solvents for many synthetic plastics, including important cellulose esters, vinyl resins, and some of the synthetic elastomers now being developed to replace natural rubber. In particular the manufacturer of Hycar OR reported that this synthetic rubber dissolves readily in the nitroparaffins, and these solutions have proved valuable in cements and in coatings used for waterproofing fabrics.[3] The solvent power of two nitroparaffins and of a typical halonitroparaffin for a number of the common synthetic plastics and elastomers follows:

TABLE 1. SOLUBILITY OF VARIOUS SYNTHETICS IN THE NITROPARAFFINS

Key: E. Excellent Solvent; G. Good Solvent; SW. Swells the Material under Test; I. Insoluble; SA. Soluble in Presence of Alcohol

Synthetic	Nitro-methane	1-Nitro-propane	1-Chloro--1-Nitropropane
A. *Hydrocarbon Soluble*			
Buna S	I	I	SW
Buna N (Perbunan)	SW	E	E
Chemigum	SW	G	E
Neoprene GN	I	SW	E
Neoprene CG	I	SW	G
Butyl Rubber		I	I
Vistanex (Medium)	I	I	I
Vistanex No. 6	I	I	I
B. *Hydrocarbon Insoluble*			
Hycar OR	E	E	E
Vinylite XYSG	SW	SW	SW
Vinylite QYNA	I	SW	SW
Koron 101		SW	G
Flamenol S-717	I	SW	SW
Flamenol S-720	I	SW	SW
Butacite			
Commercial Grade	I	I	I
RH-410 M	I	G	E
RW-410	I	G	G
Cellulose Acetate	G	SA	I
Cellulose Acetobutyrate	G	E	E

Uses in Rubber Cements

The use of accelerated rubber cements has been limited in the past because of their instability. The cements very often gelled quickly after they were prepared; it was necessary, therefore, to formulate them as two separate solutions which could be mixed just before the cement was used. This procedure, besides being inconvenient, was very wasteful since any unused cement quickly gelled and became worthless. For example, if a typical two-part cement of the following composition is mixed for use, it will gell within a short time so that it can no longer be used.

RECIPE 1

Dissolve in benzene or other suitable solvent:

	Part A	Part B
Rubber	100	100
ZnO	10	
Sulphur	6	
Zinc dibutyl dithiocarbamate		1
Polybutyraldehyde aniline		1
	116	102

However the addition of a quantity of 1-chloro-1-nitropropane equal to the weight of the rubber inhibits greatly the gelling time, and the use of the cement becomes much more convenient and economical. Thus this important objection to accelerated rubber cements may now be eliminated by use of the nitroparaffins and their derivatives as gelling inhibitors.[4]

The effectiveness of a typical nitroparaffin and of a typical halonitroparaffin in stabilizing a cement of 10% rubber content made with various solvents is illustrated in Table 2. The non-volatile portion of these cements was the same as that of the two-part cement described in Recipe 1.

TABLE 2. NITROPARAFFINS AS STABILIZERS FOR RUBBER CEMENTS

Solvent	% Stabilizer by Wt.	Benzene	Naphtha	Ethylene Dichloride
		Gelling Time at 50° C. Hours		
	None	33.5	144	87
1-nitro-2-methylpropane	1	39.5	132.5	96
1-nitro-2-methylpropane	5	54.0	118	111
1-nitro-2-methylpropane	10	57.5	108	> 284*
1-chloro-1-nitropropane	1	63.5	201	> 284*
1-chloro-1-nitropropane	5	162	> 411*	> 284*
1-chloro-1-nitropropane	10	> 421*	> 411*	> 284*

*Not gelled when test was stopped.

The results given in Table 2 indicate that nitroparaffins retard gelling in benzene and ethylene dichloride cements, but promote gelling in naphtha cements. Halonitroparaffins, on the other hand, serve as anti-gelling agents in all three solvents.

The tests reported in Table 2 were run at 50° C. in order to produce quick results. These results, however, are not necessarily an indication of the stability of cements during storage under normal conditions. As a more practical test, samples of these cements were stored at 82° F., and after three years those containing 1-chloro-1-nitropropane were still fluid.

All of the foregoing tests were made on cements that contained no pigments. The effect of loading agents on the stability of cements containing 1-chloro-1-nitropropane was studied by aging a series of cements prepared by direct mill-mixing of Recipe 1 and adding 100 parts by weight of the loading agent for each 100 parts by weight of rubber. With each pigment two cements were prepared: one with and one without 1-chloro-1-nitropropane, and all the cements were aged at 50° C. The results are given in Table 3.

TABLE 3. STABILIZATION OF LOADED CEMENTS WITH 1-CHLORO-1-NITROPROPANE

Pigment	Gelling Time at 50° C. without 1-chloro-1-nitropropane Hrs.	Gelling Time at 50° C. with 1-chloro-1-nitropropane Hrs.
None	32	1224*
Whiting	31	1224
Magnesite	31	384
Lithopone	31	840
Titanium dioxide	22	1224

*Not gelled when test was stopped.

Table 3 indicates that 1-chloro-1-nitropropane inhibits

[1] Thermatomic Carbon Co., Terre Haute, Ind.
[2] Commercial Solvents Corp., Terre Haute, Ind.
[3] "Hycar Synthetic Rubber Compounding Manual", 1, 8 (1941).
[4] U. S. patent Nos. 2,251,220 (July 29, 1941) and 2,297,871 (Sept. 4, 1942) A. W. Campbell, assignor to Commercial Solvents Corp. A. W. Campbell, *Ind. Eng. Chem.*, 33, 809 (1941).

gelling satisfactorily in cements containing inert loading agents. Other experiments have definitely shown, however, that strongly basic materials such as lime and magnesia destroy the inhibiting action of 1-chloro-1-nitropropane, probably because of salt formation, since the nitroparaffins can react as acids in the presence of alkaline materials. For the same reason cements that are accelerated with diphenylguanidine (an alkaline compound) cannot be stabilized with 1-chloro-1-nitropropane.

Cements prepared from the various butadiene rubbers have been stabilized satisfactorily with the chloro-nitroparaffins. The results of comparative tests on three of the synthetics are given in Table 4.

TABLE 4. STABILIZATION OF SYNTHETIC RUBBER CEMENTS BY 1-CHLORO-1-NITROPROPANE

Formula	#1	#1-A	#2	#2-A	#3	#3-A
Hycar OR	100	100				
Perbunan			100	100		
Buna S					100	100
ZnO	2.5	2.5	2.5	2.5	2.5	2.5
Sulphur	0.5	0.5	0.5	0.5	0.5	0.5
Butyl zimate	0.5	0.5	0.5	0.5	0.5	0.5
Polybutyraldehydeaniline	0.5	0.5	0.5	0.5	0.5	0.5
Cements made up to 20% rubber content	Methyl isobutyl ketone		Benzene		Benzene	
1-chloro-1-nitropropane used at 20% on the total cement	No Anti-gel	Anti-gel Added	No Anti-gel	Anti-gel Added	No Anti-gel	Anti-gel Added
Gelling time at 50° C. (Hrs.)	23	462*	29	388	42	388*

*Not gelled when test was stopped.

In general, highly accelerated cements with excellent non-gelling characteristics can be prepared from natural rubber, Hycar OR, Perbunan, and Buna S by inhibiting vulcanization through the use of 1-chloro-1-nitropropane or other nitroparaffins. Such cements tend to have excellent bonding power, but the chloronitropropane causes somewhat slower curing owing to retention of the anti-gel in the film.

Heat Sensitization of Latices

Experiments on rubber latices have shown that the nitroparaffins and their derivatives are very effective heat sensitizers for aqueous dispersions of rubber and rubber-like materials, both natural and synthetic.[5] The effects of a typical nitroparaffin, a typical halonitroparaffin, and a typical nitroalcohol on a natural rubber latex are given in Table 5.

TABLE 5. NITROPARAFFINS AND DERIVATIVES AS HEAT SENSITIZERS*

Formula: 60%† Hevea latex	167 g
ZnO dispersion	4 g
Heat sensitizer	2 g
	173 g

Temperature	28° C.	50° C.	80° C.
	Gelling Time in Hrs.		
Blank	No gel	6.17	0.13
Nitroethane	24	0.22	0.07
1-chloro-1-nitropropane	48	0.50	0.10
2-nitro-2-methyl-1-propanol†	240	3.33	0.10

*For further tests on these homologous series, see *Ind. Eng. Chem.*, 1942.
†The nitroalcohol was added as a 10% aqueous solution in order to prevent local coagulation.

The tests reported in Table 5 disclose the interesting and unexpected fact that compositions sensitized with 2-nitro-2-methyl-1-propanol require a long time to gel at room temperature, but they are very sensitive to heat at 80° C. Further work has shown the sensitized latices to remain unchanged during long storage at room temperature if a very stable latex is used in their preparation. Latices sensitized in this way may be used in any commercial process such as the manufacture of sponge rubber and of molded and dipped goods where the use of heat for rapid establishment of the desired gel is permissible.

[5] Patent application by A. W. Campbell pending, assigned to Commercial Solvents Corp., shortly to be issued. A. W. Campbell, *Ind. Eng. Chem.*, 34, 1106 (1942).

These uses for the nitroparaffins and their derivatives which have just been discussed only hint at their ultimate importance to the rubber industry. In addition to their direct uses they give every promise of proving even more useful as starting materials in formulating the new accelerators, antioxidants, and other chemicals required by the expanding field of rubber chemistry—particularly in connection with the synthetic rubber development. The versatility of the NP's in synthesis will help rubber chemists in solving many of their perplexing problems.

Electric Cable Insulation

(*Continued from page 162*)

produced by light have been reported previously.[3]

OXYGEN BOMB, 300 P.S.I., 70° C. Determinations of tensile strength, elongation, and modulus were made after aging for 48, 96, and 144 hours. The results are given in Table 5. Several of the stocks did not meet the aging requirement of the government specification.[4]

AIR BOMB, 80 P.S.I., 260° F. Determinations of tensile strength, elongation, and modulus were made after aging for four and eight hours. The results are given in Table 7.

OVEN. Tensile strength and elongation were measured after aging for 96 and 192 hours at 100° C. The results are given in Figure 3.

ORGANIC SOLVENTS. Tensile strength and elongation were determined on samples which had been soaked for 24 hours in carbon tetrachloride, gasoline, turpentine, fuel oil #2, and lubricating oil. The results are shown in Figure 4.

Swelling of the materials in the same liquids at room temperature was measured by immersing ½-inch strips into the liquid and measuring the increase in thickness after 24 hours and after 1,000 hours. The results are shown in Figure 5.

None of the stocks withstood carbon tetrachloride. Neoprene I, the "Thiokols," and some of the butadiene copolymer stocks were little affected by gasoline or turpentine. Fuel oil and lubricating oil had little effect on any of the samples except the natural rubber and Vistanex.

TABLE 7. AGING. AIR BOMB. 260° F., 80 P.S.I.

Type	Tensile Strength, p.s.i.			Elongation, %			Modulus, p.s.i.		
	Initial	4 Hrs.	8 Hrs.	Initial	4 Hrs.	8 Hrs.	Initial	4 Hrs.	8 Hrs.
Natural rubber	2830	2420	1980	580	580	550	410	400	380
25% Vistanex M	1910	1700	1450	550	540	530	380	390	400
50% Vistanex M	1090	870	760	530	540	490	350	310	360
Neoprene GN	1740	1610	1550	1020	1010	950	160	160	170
Neoprene I	1300	1290	1290	830	800	790	300	340	400
Hycar OR	1670	1500	1430	700	670	660	120	130	140
Chemigum I	900	760	610	770	650	580	100	140	150
German Perbunan	1300	670	730	690	620	660	150	140	140
Domestic Perbunan	650	490	540	720	590	630	100	130	130
"Thiokol" RD	2080	2080	2000	570	530	490	190	230	230
"Thiokol" F	770	710	620	510	420	340	480	480	490
"Thiokol" FA	760	500	450	550	290	170	430	420	...

SEA WATER AND SULPHURIC ACID. Pieces of insulated wire were tested for resistance to sea water and to sulphuric acid by bending the samples in the form of a U around two-inch diameter mandrels and immersing the bottom of the U into synthetic sea water or 10% sulphuric acid (specific gravity 1.069). One side of a 120-volt D.C. line was connected to the conductor, and the other side was connected to an electrode in the liquid through a 50-watt lamp to indicate a breakdown. None of the samples broke down within 1,300 hours except "Thiokol" F and "Thiokol" FA, which broke down in sulphuric acid after 560 and 490 hours respectively.

(*To be concluded*)

German Patents Relating to Vinyl Polymers—XI

M. Hoseh

SYNTHETIC resins of a high average molecular weight are obtained by mixed polymerization of vinyl halides and vinyl esters of lower fatty acids (119). The polymerization is conducted at 30-40° C. with the aid of catalysts such as dibenzoyl peroxide, acetylbenzoyl peroxide, or diacetyl peroxide. These catalysts can be used in combination with activators, e.g., organic acids or their anhydrides. The process is a continuous one; the polymerized material is constantly removed, and the unpolymerized recirculated. This action can be attained by using a filter press in the circuit. The medium in which the reaction is conducted is a liquid that dissolves the vinyl monomers, but does not affect the polymer. Such liquids are butane, pentane, heptane, their mixtures, aliphatic alcohols, and aliphatic ethers, ethyl ether, butyl ether, isopropyl ether. Care is taken that the concentration of the vinyl monomer in the reaction mixture be high (with respect to the total vinyl compounds present) and kept constant.

As is pointed out in (120), abietinol vinylate or hydroabietinol vinylate are successfully polymerized at temperatures exceeding 150° C. Formerly temperatures below 0° C. were used. The usual catalysts, i.e., BF_3 or its addition products with alcohols, ethers, or acids, are employed to promote the reaction. The polymers obtained by this new method, unlike the ones produced at low temperatures, mix well with drying oils as linseed oil, wood oil, or stand oil. They also mix well with numerous alkyl resins giving with them lacquers of superior qualities. Indeed, it is not necessary to start with pure abietinol or hydroabietinol. Equally good results are obtained by starting with a crude mixture of vinyl ethers obtained from catalytic hydrogenation of colophony followed by treating the hydrogenation products with acetylene.

A novel method to obtain high-molecular weight polyvinyl halides of constantly uniform quality is given in (121). The method consists in interrupting the polymerization reaction when approximately 50% of the monomer is polymerized. The non-polymerized part is distilled off for reuse. The polymerization itself is conducted as usual. Exposing the vinyl chloride to the light of a mercury lamp before charging it into the autoclave speeds the reaction. The separate polymerization of two batches 50% each takes less time than the complete polymerization of the entire batch in one operation.

New polymerization products are produced by polymerizing acrylic acid or its alkyl or aryl derivatives, e.g., methyl acrylate, phenyl acrylate, etc. together with styrol (122). The reaction is conducted as usual. Aqueous emulsions should be avoided. The usual catalysts can be used. The properties of the polymers are determined by the quality and quantity of the individual components and can be varied at will. The polymers are used primarily as protective colloids.

To polymerize polymerizable unsaturated organic liquids which produce a contracting solid polymer is employed a method which enables the formation of a uniform, unbroken rod or similar shape (123). The liquid to be polymerized is placed in a long tubular form closed at one end. While pressure is exerted on the upper open end, the lower closed end is heated. Only a narrow strip is heated at one time, and the heating continues until polymerization is complete in this particular region; then the heating moves up to the next zone above.

A rubber-like product is obtained by kneading isobutylene polymer with a small quantity of vinylcarbazole (124). After kneading, the product is heated. Similar results are obtained using a solution of the vinylcarbazole, or a solution of the vinylcarbazole and a solution of polyisobutylene. Approximately 2% of vinylcarbazole suffices to give an elastic, tough, rubber-like product. Generally, the more vinylcarbazole is used, the harder and less elastic is the product.

Highly polymerized, practically saturated, aliphatic hydrocarbons having branched chains are shaped by extruding (125). Suitable are polymerization products of isobutylene with a molecular weight of 50,000-300,000 and more. Also hydrogenation products of natural rubber can be molded by this process. The mass to be molded is heated for not too long a period at 130-150° C., then extruded through nozzles into cold molds. The usual fillers may be added if desired.

A new way for obtaining shaped polymerization products is described in (126), whereby polymerizable liquid compounds having a terminal methyl radical are polymerized in a rapidly rotating vessel, a tube or a cylinder rotating about its axis. The inner surface of this vessel is highly polished so that the polymer forming on it is smooth. Compounds which can be thus polymerized, i. e., those which have a methyl radical standing at one end, are: methacrylic acid and its esters, acrylic acid and its derivatives, organic and inorganic vinyl esters, vinyl ethers, vinyl ketones, divinyl acetylene, styrol, itaconic acid esters, etc. Depending on the results sought, may be added plasticizers, opacifiers, pigments, waxes, natural and synthetic resins, rubber chloride, etc., as well as fabrics and wire mesh. The polymerization is preferably conducted at higher temperatures and in the presence of catalysts, light, etc. The simplest shape obtained naturally is a tube, which subsequently can be cut to a sheet.

Another important application of this process is the lining of tubes, etc., with the polymer in question. If the polymer does not adhere to the wall firmly, it can be made to do so by previously dressing the wall with gelatin, drying oils, soap, phenol-formaldehyde condensation products, or similar substances. It should be emphasized that polymers produced by this method are free of air bubbles.

A method for producing new synthetics is described in (127), whereby a mixture of styrol and an aromatic ether, e.g., phenol ether or naphthol ether, is treated with acid-reacting or acid-yielding substances. Suitable ethers are alkylphenol ether, hydroxyalkylphenol ether, phenoxyacetic ester, or the corresponding naphthol compounds. As acid substances can be used fluoboric acid, $SnCl_4$, etc. The relative amounts of the two reactants may vary greatly. Thus a molar ratio of phenol ether to styrol of 1:10 yields a resin soluble in

benzine, drying oils, and non-drying oils. Generally the more phenol ether the lower is the softening point. At a molar ratio of 1:1 the product is a viscous oil. The reaction is conducted in an inert solvent, e.g., CCl_4, benzine, benzene, toluene, etc. Excess heat which may evolve is taken care of by proper cooling. At the end of the reaction the promoters are removed by treatment with CaO or BaO. Simultaneously with it is added a bleaching clay to decolorize the product. The clear high-molecular product is a valuable substance for plastics and oil lacquers. The viscous oily products are utilized as plasticizers and as intermediaries for lacquers and plastics.

Tetrahydronaphthalene, its homologs and halo compounds substituted with aralkyl or cycloalkyl radicals are very effective plasticizers for polyvinyl compounds (128). Very desirable for this purpose are: benzyl-, phenyl-, dibenzyl-, methylbenzyl-, dimethylbenzyl-, and cyclohexyltetrahydronaphthalene. Also p-chlorobenzyl-, dichlorobenzyl-tetrahydronaphthalene, and the higher chlorinated benzyl-tetrahydronaphthalenes, as well as their derivatives and homologs. These products are obtained by treating tetrahydronaphthalene with an aralkyl halide or cycloalkyl halide and an acid condensation agent such as $AlCl_3$ or $ZnCl_2$.

Methacrylic acid, its derivatives, esters, acid anhydrides, hydrochlorides, acid amides, acid nitriles, either by themselves or mixed, are very effectively polymerized by substances yielding oxygen (129). Hitherto methacrylic acid was polymerized either with the aid of heat or by letting it stand in the presence of HCl. Among such oxygen yielding substances are: acetyl peroxide, benzoyl peroxide, ethyl peroxide, H_2O_2, Na_2O_2, BaO_2, N_2O_4, N_2O_5, chromic acid anhydride, persulphuric acid, persulphates, ozone, ozonides, etc. Supplementing the action of the peroxide with heat and/or pressure enhances the reaction. In many instances it is advisable to work in the presence of auxiliary liquids; among these are the organic solvents acetone, acetic ester, benzene, alcohol, CCl_4, $CHCl_3$, and in some instances water. Plasticizers, fillers, pigments, etc., can be incorporated if desired. The great advantage of this new method is that it permits controlling the rate of reaction and predetermining the degree of polymerization desired.

For polymerizable compounds somewhat soluble in water, such as those containing the vinyl group and for which emulsion polymerization is not practical, a medium was found which permits the polymerization of such compounds in emulsion (130). This medium consists of a mixture of (1) an organic solvent in which the monomer is soluble, but the resulting polymer is insoluble; and (2) an emulsifier soluble in the aforesaid organic solvent, which has the ability to wet or dissolve the monomer or the polymer. The polymer is obtained in an emulsified state, or it separates out in a finely subdivided state. The emulsion can be used directly, e.g., for impregnating processes, or the polymer can be precipitated from it.

A further improvement over (75)[1] *wherein the batch process is replaced by a continuous one is outlined in (131).* The polymerization is conducted as outlined in (22).[2] The product is cooled to —10 to —40° C. to incipient gelation. The gelled product is then pressed through a nozzle of any desired shape into a precipitating bath (containing a non-solvent liquid). In this latter the polymer forms a continuous band or thread, depending on the nozzle used. From the precipitating bath the band or thread is continuously removed on a conveying unit, and upon drying is ready for use. This improved process not only enables continuous production and time saving, but saves appreciably on cost of production by dispensing with the precipitant.

In (132) the formation of glass bubbles, a difficulty caused by excessive temperatures, encountered in manufacturing glass substitutes or so-called organic glasses is eliminated. Specifically, to the monomer, usually methacrylic acid esters of the lower alcohols, is added the same or similar polymer; then the polymerization is conducted as usual. Preferably the reaction is started at a low temperature that does not cause the formation of air bubbles, and then it is gradually raised. This innovation also permits the reaction to be conducted in molds; so the ready polymer may have directly the desired shape.

An improved procedure for more effective polymerization of vinyl halides is described in (133). By this improved procedure the polymerization is conducted in a medium containing (1) water and (2) an organic liquid which dissolves water, but does not dissolve the polymer or dissolves it only very little. Such liquids are the lower aliphatic alcohols, ethyl ether, acetone, glacial acetic acid, dioxane, etc. The relative volumes of the water and the organic liquid may vary. The water may exceed its solubility in the organic liquid, but it should not exceed the total volume of the latter. The relative amounts of these two determines the nature of the polymer. This process reduces considerably the time required for polymerization and yields a much more viscous product.

Vinyl compounds containing fluorine could hardly be polymerized hitherto. However if vinyl compounds contain beside fluorine also Cl, their polymerization presents no difficulties (134). The properties of fluorine containing polymers are vastly superior to the properties of similar compounds without it. They are resistant to the chemical action of air, light, ozone, water, solvents, and various chemicals and are flame resistant. This last property increases with the amount of F in the polymer e.g., trifluorochloroethylene, but decreases with the amount of other organic radicals associated with the vinyl radical. The flame resisting properties of these substances make them suitable for replacement of metals and mineral products.

[1] See India Rubber World, June, 1942, p. 249.
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(*To be continued*)

EDITORIALS

Baruch Committee Should Report Again

WITHIN six months after making public the results of its first investigation of the rubber situation the Baruch Committee should be asked by the President to review the situation again and make a second report on the progress made on the vital problems of rubber conservation and supply. That this Committee realized the need of a review of part of the situation is indicated in its recommendation that "*a survey of milling, mixing and tire building facilities and processes be made about March 1, 1943.*"

We all know that in our democratic way of life situations develop in public or private industry where conditions go from bad to worse until finally it is necessary to select a committee of impartial and capable experts to investigate the difficulty and make recommendations for improvement to prevent a crisis. In this case the government, industry, and the public were fortunate in being able to obtain a committee of men of outstanding ability to do the job, and it has been generally agreed by everyone that their report was an exceptional piece of work.

However the fact that the success of the rubber program is vital to our national welfare is evidenced in early part of the Committee's report: "*We find that the existing situation to be so dangerous that unless corrective measures are taken immediately this country will face both military and civilian collapse. The naked facts present a warning that dare not be ignored.*"

Corrective measures have been taken and will continue to be taken until practically all of the recommendations made have been put into effect, but herein lies the danger. In spite of appointments of new administrators, reorganizations of government agencies, and the general feeling of optimism in that what appeared to be almost insurmountable difficulties were now on the way to elimination, the magnitude of the effort required is so great and the necessity of almost perfect performance is so evident that the review of the whole situation at the time indicated by this same committee is essential.

A study of the public record of estimated dates of completion of synthetic rubber plants, the narrow margin between the exhaustion of our stockpile of crude rubber and our obtaining an adequate production of synthetic rubber, the considerable difficulties that remain to be solved in the use of synthetic rubber, the progress of tire conservation and replacement program, and innumerable other items prove beyond doubt that a review of the progress of the rubber program on or about March 1, 1943, by this same committee should be about one of the most important things for the national welfare that should be undertaken at that time. There is good evidence that the new rubber administrator will do a real job, and his deputy administrator and technical committee are exceptionally well chosen, but we must try to forsee any and all contingencies. It took eight months after Pearl Harbor for a decision to be made to really get a complete picture of this rubber crisis, and when we did, we got an excellent one, but one without any overabundance of "blue sky." If we are successful in carrying out all of the recommendations, it is very probable that we can look up within about six months and find that the sky is really clearing, but there is a very definite possibility of many other events of national proportions taking place in our military and civilian war effort at about this same time. We certainly need to make provisions now that a report of the same clear-cut type on the progress of the rubber program be made early in 1943.

If this is done, and we find that we are really on the way to success in our program, all well and good; if we find that our performance leaves much to be desired, we may still have time for further changes and readjustments before our reserves are completely exhausted.

The Changing Scene

THE supply of crude rubber available for use in the United States during the year 1940 was 943,902 long tons. Before any consumption, the supply available to the United States for the year 1944 is estimated in the Baruch Report as 1,024,000 long tons. This last figure is made up as follows: natural rubber, 68,000; Buna S, 705,000; neoprene, 59,000; Butyl, 132,000; and "Thiokol," 60,000. To these figures the addition of 140,000 long tons of Buna S was also recommended.

These figures in themselves pose an important question: Will the industry be able to handle this changeover with even a reasonable degree of success in view of the fundamental differences that are evident in the raw materials, their processing characteristics, and finished goods properties? Of course much is being done already by the WPB and the industry to meet this situation. But will it be enough? There is some evidence that the problem may be even greater than at first considered.

An additional suggestion offered as a possible means of providing more help with this problem is that the industry by means of financial support to certain universities or institutes of technology could make possible practical courses of training in rubber technology for young students of proper qualifications as part of the university course so that these students may be available almost immediately upon completion of their formal training for service in the industry and without the usual loss of time necessary in training them for the practical work in the industry. For the older men in the industry, training courses to provide a more complete knowledge of the new technology in the broader field of synthetic rubbers and plastics is equally essential. The new rubber industry will cover a much broader field and require a much broader knowledge of chemical manufacturing methods than the old and will therefore require workers equal to this greater task.

What the Rubber Chemists Are Doing

A. C. S. Rubber Division Activities

Boston Group Has Program on Synthetic Rubber

A LARGE number of members and guests (204) of the Boston Group, Division of Rubber Chemistry, A. C. S., attended a meeting devoted to synthetic rubber at the University Club, Boston, Mass., October 23. Dinner preceded the meeting and was followed by a paper by W. D. Parrish, of the Hycar Chemical Co., Akron, O., on "Compounding of Hycar Synthetic Rubber", and talks by J. M. Ball and R. F. Wolf, of the War Production Board, Washington, D. C., on the various aspects of synthetic rubber uses, availability, and allocation.

Mr. Parrish discussed the compounding and processing of Hycar OS-10, OS-20, and OR-15. Besides the generally accepted procedure of remilling compounded stocks after allowing them to stand several hours or overnight after the original milling and compounding, the use of master batches and sulphur carriers was recommended as a further aid to improve sulphur dispersion and final physical properties. The use of semi-reenforcing furnace blacks wherever possible in order to reduce the high heat build-up resulting from the use of channel blacks was also suggested. Slides were shown of compounds using blends of OS and OR types to obtain specific properties; for example, an appreciable amount of OS-20 blended with OR-15 produced a stock the oil resistant properties of which were only slightly less than a more expensive all OR-15 stock. The compounding and processing of the OR-type rubber with special reference to the use of the proper plasticizers, curing agents, etc., and calendering and extruding operations as well as information on Banbury mixing were covered. Slides of typical compounds for tire treads, soling, and mechanical goods for special purposes, as heat resistance, low compression set, solvent resistance, etc., were presented. Information on the compounding of OR-15 for hard rubber applications was also reported in some detail.

The second talk, made by Mr. Ball, of the Educational Committee on Synthetic Rubber, Rubber and Rubber Products Branch, WPB, had as its purpose answering questions on the industry's problems in securing and using synthetic rubber, asked by members of the Boston Group, which had been assembled and forwarded to Mr. Ball by Chairman Donald Wright. Mr. Ball in his opening remarks stated that he had obtained information with which he could reply to the questions from the following members of the WPB on the various subjects: Mr. Wolf (synthetic rubber); R. P. Kenney (vinyl polymers); R. G. Ruark (plasticizers and softeners); A. H. Smith (accelerators, antioxidants, and aromatic solvents); William Mueller, Harry Howard, H. J. Lucey (other solvents); and T. J. Starkie (carbon black). A summary of the talk follows.

Buna S. This rubber is being allocated now as a replacement for rubber for every purpose for which rubber is now permitted. Early in 1943 it is expected that allocations of Buna S will be combined with those of rubber. The chief uses are expected to be in tires and tubes, mechanical goods, wire insulation, footwear, and certain druggists' sundries. Amounts up to a few tons a month may be obtained now. In January, 1943, about 2,000 tons will be made; thereafter the production will increase each month up to January, 1944, to the full amount now contemplated. The present bottleneck is butadiene and is expected to remain butadiene until some time in 1943. Specifications for Buna S have been standardized, and the new polymerization plants now being built have been designed for standard operations. As greater production is realized, it is believed that Buna S will be more uniform than crude rubber and that variability will practically disappear.

Butyl. The allocation of this rubber is the same as for Buna S. The chief uses are expected to be in self-sealing gasoline tanks, balloons, boats and floats, gas masks, gas resistant clothing, possibly civilian tires and recaps, inner tubes, mechanical goods, wire insulation, footwear, and sundries. About 600 tons are expected to be available in December, 1942, and production will then increase up to January, 1944, to the full amount contemplated. Different types of Butyl rubber have been made, depending on the kind and the proportion of diolefin used. Present production is of three grades, A, B, and C, according to tensile strength. In production in the large plants it is expected that variability will be much reduced so that only one grade of each type will result. Flexon corresponds to a low tensile grade and may not be produced in large volume because its manufacture is very wasteful of raw materials needed for other purposes.

Neoprene is being allocated for established uses and also for new uses as a replacement of rubber where it will do a better job than rubber, or where it will replace more than its own weight or volume of rubber. The new uses are expected to be in hose and cable jackets, either alone or mixed with reclaimed rubber, and possibly in tires. During October about 800 tons a month should be added to the already existing production of 700 tons monthly. Further increases will be made during 1943 up to the full amount now contemplated.

Buna N. Allocations are for established uses and also for new uses as a replacement for rubber where oil resistance is of primary importance. Present plant capacity is about 1,500 tons a month, but production is only about 1,000 tons owing to an insufficient supply of acrylonitrile. The supply of acrylonitrile is expected to increase in 1943.

Thiokol. Allocations are for established uses as gasoline, oil suction, discharge, and bullet-proof hose. It is also being allocated for new uses as a replacement for rubber where oil resistance is of primary importance. The big use today is in gasoline storage cells and small gasoline bags, either frictioned or latex impregnated. Recaps for civilian tires are the biggest potential use. Present production is about 250 tons a month of Type "FA" and latex combined. A big expansion is contemplated next year to consist wholly of Type "X" to take care of possible recap requirements.

Vinyl Polymers. Koroseal and VYNW are nearly all going into wire and cable. Other replacement uses are those involving some advantage over rubber, e.g., with respect to chemical resistance, flame resistance, cold resistance, and heat sealing. VYNS, VYHH, and Saran are being used almost entirely for Army and Navy replacement uses where the physical requirements are somewhat less severe than with Koroseal and VYNW, e.g., raincoats and rainsuits. The only civilian uses for VYNS are for hospital sheeting and protective clothing; and the requirements for these uses will be kept at a minimum. All these polymers mentioned so far are covered by General Preference Order M-10. As of November 1, polyvinyl butyral, acetate, and alcohol will also be covered by M-10. The situation on all these polymers is critical as regards supply; therefore expansion is planned for Koroseal and VYNW. Present production of all of these polymers is about 2,500 tons a month, with an estimated 1943 production of about 3,500 tons monthly.

Reclaimed Rubber. Where reclaim can be used to save rubber, or to conserve the slowly growing supply of synthetic rubber, its use will be freely allowed; but, on the other hand, if reclaim can be replaced at any time by a substitute material as a vinyl polymer, that replacement will be made mandatory. In other words, no general restriction on reclaim is contemplated, but its waste will be prevented as far as possible.

Plasticizers and Softeners. Softeners for the Buna types of synthetic rubber are readily available today, and no shortage of these materials is anticipated for the synthetic rubber program as set up today. Plasticizers for the vinyl polymers are sufficient for Army and Navy requirements. When increased production of vinyl polymers is introduced, we will have a corresponding increase of plasticizer production. Tricresyl phosphate for plasticizing vinyl compounds is one, however, that is extremely critical today.

Accelerators and Antioxidants. On the assumption that the types of accelerators and antioxidants for synthetic rubber will be either the ones used for natural rubber or that the bulk of them will be those requiring the same raw materials and manufacturing equipment, it is expected that the demand for these materials both for syn-

thetic rubber and natural rubber for the years 1943 and 1944 can be taken care of without undue difficulty.

Carbon Blacks. No shortage of channel blacks is expected at least until late 1944. Of the semi-reenforcing and soft blacks, present production is about 145 million pounds a year, and the approved expansion now under construction will provide for an additional 87 million pounds. Estimated requirements for these two types of blacks by the end of 1943 is about 300 million pounds. These blacks are covered by General Preference Order M-244, effective November 1.

Solvents. Benzol, toluol, and xylene are all critical, and permission to use these will be refused in cases where a petroleum distillate will suffice. Benzol is covered by General Preference Order M-137, toluol by M-34, and xylene by M-150. Petroleum solvents are freely available and are covered by General Preference Order M-150. Butyl alcohol and acetate are critical and are covered by General Preference Order M-159. Acetone is unrestricted. Methylethyl ketone is not critical at present, but is covered by General Preference Order M-169. Chlorinated hydrocarbon solvents are all critical and are under General Preference Order M-41.

Mr. Ball stated that the object of Dr. Simmons' committee is to meet with technical representatives of the various branches of the industry, when problems involved in making the change from natural to synthetic rubber are discussed and divided up for solution, the belief being that by this means the changeover could be made as efficiently as possible. When results of commercial importance are obtained, they will be made available to all the rubber goods manufacturers concerned. In this dissemination of worthwhile information the suppliers of compounding ingredients, synthetic rubber, and reclaimed rubber are playing an important part. This committee is being expanded by the addition of specialists in the various synthetics, who are to travel and consult with the rubber goods manufacturers.

R. H. Wolf, of the Allocations Section, Rubber and Rubber Products Branch, followed Mr. Ball and in his opening remarks explained his "problems" in connection with the allocation of synthetic rubber with reference to whether he was operating from Washington or from the field. He announced the recent appointment of W. H. Peterson to handle these allocations for the Boston area and introduced Mr. Peterson who was present in the audience. Mr. Wolf again defined the allocation policy which is to approve Buna S and Butyl rubbers for every purpose for which crude rubber was now permitted, but emphasized that the specialty rubbers as neoprene and Buna N would only be allocated where they would do a better job than natural rubber. Strong emphasis was placed on the necessity of the industry learning as much as possible about the compounding and processing of Buna S and Butyl rubbers before the middle of 1943, at which time these would be the only rubbers available in quantity for practically all uses. Reference was made to the recently established prices for government Buna S of 50¢ a pound and for neoprene of 65¢ a pound as given in Circular No. 9 distributed by the Rubber Reserve Co. September 28.

A nominating committee of E. Krismann (du Pont), H. Liddick (Davidson Rubber), and J. Walton (Boston Woven Hose) was announced by Mr. Wright for selection of candidates for officers of the Boston Group for 1943.

The next meeting is planned for about the second week in December, at which time the program will consist of a speaker and a small Christmas party.

Akron Group Meets November 6

THE Akron Group, Rubber Division, A. C. S., will hold its fall meeting November 6 at the Akron City Club, Akron, O., with dinner and entertainment scheduled for 6:45 p.m. The speaker of the evening will be Lieut. Waynett Kuhn, of the U. S. Army Ordnance Plant at Ravenna, O. His topic is "Shell Loading", and he plans an exhibit of the arsenal's activities as well as a showing of a film on three-inch anti-aircraft shells.

Record Attendance at New York Group Meeting

The New York Group, Rubber Division, A. C. S., enjoyed a very successful meeting on October 16 at the Building Trades Employers' Association, 2 Park Ave., New York, N. Y. Almost 300 members and guests were present, a record high for attendance at a regular meeting.

Two very interesting papers were presented before dinner, one on "Current Importance of Synthetic Latices and a Review of One of Them," by R. H. Abernathy (du Pont), and "The Compounding of Carbon Black in Buna Rubber" by D. F. Cranor (Binney & Smith). In discussing the use of Neoprene Type 571 latex as a replacement for natural rubber latex, Mr. Abernathy showed how various physical properties of the finished products such as tensile strength, elongation, freeze resistance, tear resistance, etc., could be obtained by the proper use of the various compounding ingredients and also compared the handling and processing of this Type 571 latex with natural rubber latex.

In reporting on investigations carried out on the use of the various carbon blacks for compounding Buna S rubber, Mr. Cranor pointed out the value of considering the surface area of the carbon blacks in selecting any particular type to provide physical properties within a certain range for specific applications. He suggested the need of a more accurate nomenclature for describing the various types of blacks in order to avoid confusion and misunderstanding among rubber technologists. The importance of avoiding the overcuring of Buna S compounds was emphasized, and the value of considering the old fashioned hand measures or qualitative approach, as well as physical tests in selecting the cure with the best all around properties, was stressed. In this connection a new test for determining the "heat embrittlement" of rubber compounds was illustrated by E. Valden, of the research laboratories of Columbian Carbon Co. By means of this test the time necessary for a sample of a synthetic rubber stock to break when heated to a temperature of about 160° F. and under a constant fixed load can readily be determined as an indication of cure condition most free from dangerous embrittlement effect. While this occurs at a state of under cure, good technical cure develops at an early time interval thereafter. Heat build up, particularly under conditions of constant deflection, is not excessive at cures which exhibit relatively good resistance to heat brittlement. In conclusion Mr. Cranor pointed out that while Buna S magnifies differences between carbons and each type has its own best place, the compounder can readily balance his use with available production. With such handling, adequate supply of rubber black should be assured for wartime needs.

After dinner, entertainment in the form of a quiz program with two five-men teams in competition with each other and also to some extent with the audience provided a satisfactory conclusion for the meeting. One team, representing the Peddlers, included H. Depew (Sherwin-Williams) as captain, Mr. Abernathy, D. Scott, Sr. (Henry L. Scott Co.), J. DeC. Van Etten (Vansul, Inc.), and S. M. Martin (Thiokol). The other team, representing the Consumers, consisted of A. R. Kemp (Bell Telephone), captain, J. Miscall (Essex Rubber), P. A. Cady (Manhattan Rubber), M. Buffington (Lea Fabrics Co.), and S. Rosch (Anaconda Wire). Prof Quiz was finally revealed as A. A. Somerville (Vanderbilt), who conducted the program with a professional air despite a somewhat unruly audience. After a bitter contest, the Consumers were declared the winners by the judges, George Vila (Naugatuck Chemical) and Larry Edland (Rodic Rubber), and were awarded prizes of Remington shavers. The losers were consoled with prizes of books on rubber including the recent publication by Harry L. Fischer. Fifteen other prizes of a varied nature were awarded to members of the audience who were able to answer questions which had stumped the experts. Twenty-five questions were selected for use in the program from those submitted prior to the meeting and for which the originators were paid one dollar.

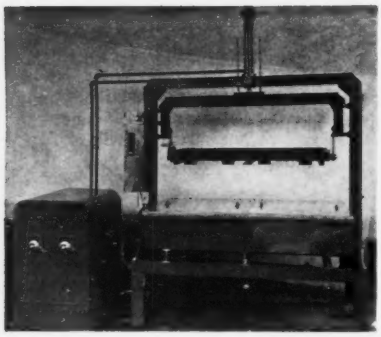
A nominating committee for candidates for officers for the coming year was appointed as follows: C. R. Haynes (Binney & Smith), chairman, C. A. Bartle (du Pont), and K. J. Soule (Manhattan Rubber). This committee is to report at the next meeting some time in December.

L. A. Has 80th Meeting

THE Los Angeles Group, Division of Rubber Chemistry, A. C. S., meeting, held October 6 at the Mayfair Hotel, Los Angeles, Calif., was attended by 148 members and guests. The meeting was opened with the showing of a colored film by Herman Jordan, of E. I. du Pont de Nemours & Co., Inc., which covered the summer

(*Continued on page* 190)

New Machines and Appliances



Smooth Dipping Action Obtained by Means of an Oil-Operated Hydraulic System

Black Rock Dipping Machine

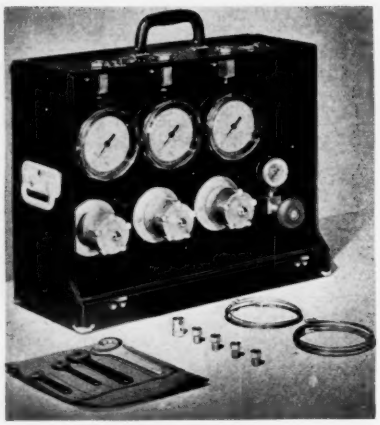
A DIPPING machine designed to give variable control of the immersion and withdrawal speeds to suit the article being dipped and its coating material has been developed by The Black Rock Mfg. Co., Bridgeport, Conn., and sizes can be furnished to suit particular requirements. The downward and upward movement of the rack occurs at a predetermined fast and slow speed over any predetermined part of the desired length of travel. After withdrawal from the tank the rack can be manually revolved on its axis to facilitate even spreading of the coating material over the forms.

The smooth action to the immersion and withdrawal strokes results from the oil-operated hydraulic system which also is so flexible that the number of combinations for feeds and varying strokes is infinite. This is believed to be the first commercial dipping machine using the oil-operated hydraulic system.

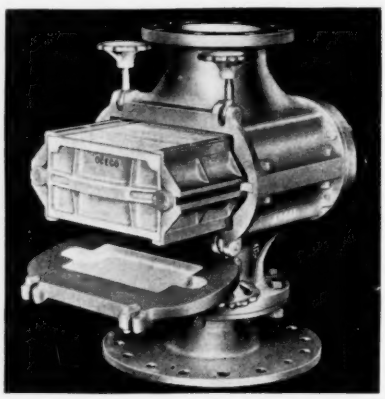
Draining of the tank is effected by a drain cock not shown in the accompanying illustration, which represents a 4-LD dipping machine built only for one particular type of article.

Portable Pressure Gage Tester

THE Grove gage comparator has been designed to check quickly and efficiently all types of mounted pressure gages in service without removing them from their panels or mountings and without breaking line connections. Equipped with three precision laboratory test gages, accurate to within ¼ or 1% of full scale, this compact comparator will check various ranges of pressure gages from 0 to 1,000 pounds. Necessary testing pressures are supplied from built-in high-capacity air cylinders, which can be charged and recharged as often as necessary with any clean, dry gas, air, or oxygen. The extremely fine degree of pressure control is made possible by three pressure loaders below each test gage, and each loader serves as an accurate pressure reducing valve with built-in automatic relief. Because of its large diaphragm-to-valve area ratio it provides positive pound-by-pound controlled and maintained accuracy of delivery pressures, whether increasing, decreasing, or constant. Grove Regulator Co.



Grove Gage Comparator

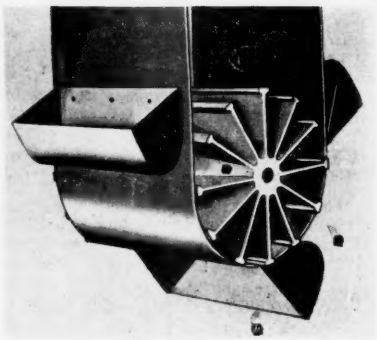


Flame Arrester for Attachment to Vents of Tanks Holding Volatile Liquids

Oceco Flame Arrester for Inflammable Chemicals

THE Oceco flame arrester permits the free passage of vapors from gas-tight tanks containing inflammable liquid chemicals, but prevents flame from entering the tank if the vapors become ignited. The propagation of flame or explosion through the lines is also prevented by this arrester in factories in which explosive gases are piped through the plant.

The equipment consists of a strong, rigid housing and cover of cast semi-steel which can withstand direct exposure to heat and flame for long periods of time without distortion or melting, and the arrester element of alternate flat and corrugated sheets of corrosion resistant aluminum. This construction results in vertical straight-through passages which minimize retention of foreign materials and moisture, and offers minimum resistance to gas flow. The net free area of the arrester element is said to be twice the size of pipe corresponding to the size of the arrester. There is a minimum of pressure drop. Inspection is easily accomplished by unloosening four hand-wheels on the cover, pulling out the element on its slide rails, and looking through the straight passages. The flame arrester is available in two-, three-, four-, six-, eight-, and ten-inch sizes. The Johnston & Jennings Co.



Used as Elevator Belt Pulley

"Belt Saver" Tail Pulley

THE cone and wing construction of the "Belt Saver" pulley is designed to prolong belt and pulley life by eliminating the damage to the bottom side of conveyer belts caused by the grinding and crushing action of material caught between the pulley and the belt. It is claimed that the pulley itself can in no way damage a belt or conveyer bucket bolts. The "Belt Saver" can be interchanged with solid face pulleys now in use on bucket elevators and belt conveyers. The wings or ribs of the pulley are spaced to receive between them all but the largest sized particles, which are discharged to either side as the pulley rotates. Sticky or moisture laden materials, where dribblings have a tendency to build up on the solid face of a pulley causing misalinement, will not present this problem as the wing-type tail pulley does not have sufficient pulley face to permit a building-up of the material. Sprout, Waldron & Co., Inc.

Wax Finish for Rubber Goods

TO HELP retard deterioration of rubber by preventing oxidation is the purpose of a new wax finish now being marketed. Application may be by dipping, spraying, or wiping. The product is said to be easy to apply, water repellent, and non-flammable. Also, a shop-coating provides a protective, non-porous finish with a long-lasting luster. S. C. Johnson & Son, Inc., Industrial Wax Division, Dept. IRW-11, Racine, Wis.

STATEX

The new colloidal carbon for reinforcing natural and synthetic rubber, which combines

1
FULL REINFORCEMENT
2
LOW HYSTERESIS
3
HIGH pH
4
ELECTRICAL CONDUCTANCE

Literature and samples for full factory runs available

A COLUMBIAN COLLOID

BINNEY & SMITH CO. - COLUMBIAN CARBON CO.

DISTRIBUTOR MANUFACTURER

STATEX— Imparts this unique combination of properties:

REINFORCEMENT

Road wear performance of channel black

•

COOL RUNNING

High rebound and low hysteresis

•

FAST CURING

High pH promotes vulcanization

•

CONDUCTANCE

Discharges static in airplane tires, munition plant specialties, other military rubber goods

•

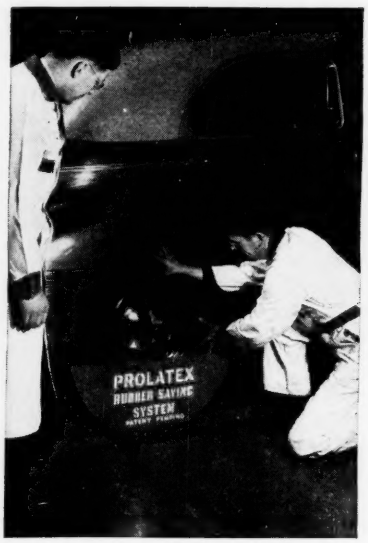
FURNEX— The High Resilience Carbon

•

MICRONEX— For 30 Years The Standard Reinforcing Carbon

BINNEY & SMITH CO. DISTRIBUTOR · **COLUMBIAN CARBON CO.** MANUFACTURER

New Goods and Specialties



Dipping Tire to Preserve Rubber

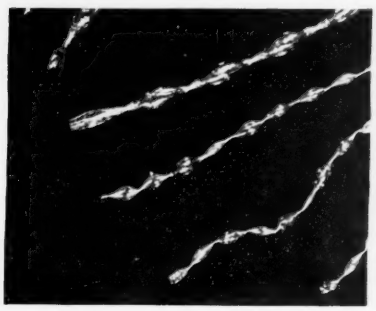
Rubber Preservative

THE Prolatex Rubber Saving System to maintain the elasticity and resilience of rubber utilizes a soya-bean oil base compounded with several materials of rubber preserving value, and a dipping tank of special construction for application of the preservative. Prolatex is described as a penetrant of low viscosity which fills pores, cracks, minor cuts, and abrasions, and seals the surface against oil, grease, gas, sun rays, and air. Although the system is said to be applicable to the preservation of various kinds of rubber articles, its greatest usefulness is indicated in tire maintenance. The design of the dipping tank permits immersion of tires while on the car, and the application, it is claimed, is uniform over all contours of tread and wall. From 20 to 30 minutes is required to treat five tires. Transmotive Laboratories.

"Bubblfil"

DESIGNED to substitute for sponge rubber or kapok is a recent product of E. I. du Pont de Nemours & Co., Inc., Wilmington, Del. "Bubblfil", as it is known, consists of a continuous stream of air-filled cellophane bubbles, resilient and buoyant, and thus recommended for such items as life-jackets, bridge pontoons, air compartments of lifeboats and liferafts, and aviation tow targets. Possible uses as a substitute for sponge or cellular rubber follow: as a shock absorbing material, for mats or cushions (bullet-proof) as padding in airplanes or tanks, as interlining for cold-weather jackets or flying suits, or as filler for sleeping bags.

The product, moreover, is said not to ignite when struck by tracer bullets and can also be made flame resistant by chemical treatment. Another advantage is its light weight. "Bubblfil", as indicated by tests, is stable to extremes of temperature. The bubbles cannot be broken by squeezing, nor will they rupture at low pressures of high altitudes. Another important characteristic is its low thermal conductivity.



Strands of Cellophane Bubbles

Steel-Carcass Conveyer Belts

A NEW type of conveyer belt which uses steel cables in place of the customary cords or fabric has been developed by the Goodyear Tire & Rubber Co. to convey iron ore and perform other tasks where extra-strong belts are required. The new belt is no thicker than a six-ply conveyer belt, but has a strength equivalent to 14 such plies. The carcass of each steel-cable belt consists of parallel steel cables, each cable containing a multiplicity of closely-laid thin strands, and in appearance does not differ from any other conveyer belt, as the rubber surface on each face and at the edges is applied in identically the same manner as if the carcass were cotton cords or fabric. The steel cables permit a maximum of troughing without injury to the belt itself and obviate the need of transferring material from individual belts in tasks which require lifting while conveying.

Tire "Sandal"

A COVER made from a carpet-like woven cotton pile fabric treated with an asphalt emulsion and somewhat resembling a closely stitched bath mat of rug is reported to be capable of adding from 2,500 to 3,000 miles of wear to tires. Efficient use of the "sandal" requires 40 pounds of pressure in tires and limitation of speed to 30 miles an hour. Present production plans call for manufacture in popular passenger-car sizes. Further development will be conducted to obtain a material suitable for light-delivery truck tires. The tire "sandal" is not so practical or so cheap as recapping tires, but because rubber is not available for civilian tire use, it affords a possible relief to the civilian tire situation. The material could be used by the armed forces for tires on portable air compressors, bomb carriages, and for civilian defense fire carts, but would not be feasible for use on the army's motorized equipment with high-speed requirements. United States Rubber Co., 1230 Sixth Ave., New York, N. Y.

Cover of Non-strategic Materials for Civilian Tires

New Goodrich Hose

A NEW sandblast hose which replaces the Goodrich Anti-Static sandblast hose, and in which no wire is used in its internal construction, is made of an abrasion-resistant rubber compound that carries away static electricity as fast as it forms. Designated as "B.F.G.", the resistance of the rubber compound is only 3,000 ohms per centimeter cubed, and for high voltages of static electricity is practically as good a conductor as metal. The hose is made in four-ply construction with ¼-inch tube, in sizes ranging from ¾-inch to three inches.

Substitution of Ameripol for natural rubber in the Type 400SS oil hose now makes this all-synthetic-type hose resistant to oils, gasolines, or other solvents of natural rubber while affording stronger adhesion of all parts with an additional margin of safety against ply separation. B. F. Goodrich Co.

Hevealac—Rubber Finish

A LIQUID coating product, Hevealac, produced by the Glyco Products Co., Inc., is claimed to render rubber and synthetic rubber products surface tack free. Small finished rubber articles may be tumbled in a bath of Hevealac, or, in the case of larger objects, the coating may be brushed or sprayed on. Hevealac provides a clear, transparent, flexible surface of high luster, is fast drying, and gives a continuous film considerably resistant to gas.

UNITED STATES

Dewey Rubber Deputy Director; Government Plan for "Tires-for-All"

Egan Photo Service

Bradley Dewey

Rubber Director William M. Jeffers has appointed Bradley Dewey deputy director. Colonel Dewey, associated with the Dewey & Almy Chemical Co., Cambridge, Mass., is a consultant to the Army Quartermaster Corps and the Chemical Warfare Service, a life member of the Corporation of Massachusetts Institute of Technology, and a member of many scientific societies. Dewey & Almy is one of the pioneers in synthetic rubber research in the United States, the second company in the country to use rubber latex on a commercial scale, and one of the first to substitute man-made dispersions for the natural product. In December, 1941, the company was granted priorities to erect a plant to produce buna rubber and went into successful operation last August.

A staff of technical consultants was also appointed by Mr. Jeffers to serve under Colonel Dewey, who is responsible for the technical aspects of the rubber program. Those named are: E. B. Babcock, chief chemist, Firestone Tire & Rubber Co., Akron, O.; L. D. Tompkins, vice president, United States Rubber Co., New York, N. Y.; E. R. Gilliland, professor of chemical engineering at Massachusetts Institute of Technology, Cambridge, Mass.; W. L. Campbell, New York, vice president of the American Machine Defense Corp.; Morehead Patterson, president of American Machine Foundry Co., New York, and Ray P. Dinsmore, manager of development, Goodyear Tire & Rubber Co., Akron.

Several recommendations of the Baruch Committee have already been carried out by Rubber Director Jeffers, who asked for nation-wide coupon rationing of gasoline September 25. The program, placed in charge of the OPA, will go into effect November 22 and is designed to provide minimum passenger-car mileage to 2,880 miles a year. Mr. Jeffers also recommended a nation-wide maximum speed limit of 35 miles per hour, which Joseph B. Eastman, director of the ODT, ordered the governors of all states to put into effect October 1. OPA Administrator Leon Henderson announced the merger of the gasoline and the tire rationing programs, effective November 22. Under the mileage rationing program, gasoline rationing will become the means used to conserve the rubber in our stockpile and now on running wheels.

"While the plan in general is similar to the plan now in effect in 17 Eastern States, it is meshed at every point with tire conservation so that gasoline rationing in effect becomes mileage rationing," Mr. Henderson declared.

Innovations in the plan that was operating in the East include periodic tire inspections as a requirement for any renewal of rations, as well as for any application for tires or recaps, revoking of rations held by speeders, and certification that the applicant for a gasoline ration owns no more than five tires per passenger vehicle. The government already is buying motorists' surplus tires. An announcement by the OPA on October 17 rules that motorists must have their tires inspected between December 1, 1942, and January 31, 1943. Fees for inspection will be charged and inspections will take place every four months thereafter. Commercial vehicle tire inspection starts November 15, and tires must be inspected every two months or every 5,000 miles, whichever comes first.

The government's plan to provide "tires-for-all" and keep passenger cars rolling for essential mileage for the duration were outlined in five steps by Mr. Henderson:

1. Rationing of used tires and recaps, and new tires now in stock to provide as far as possible the minimum essential mileage to each of the nation's passenger cars.

2. Actual control of each car's mileage through the rationing of gasoline to prevent unnecessary driving as far as possible, and to hold the national average down to about 5,000 miles per car per year.

3. Compulsory periodic inspection of all tires to guard against abuse and to prevent wear beyond the point where they can be recapped.

4. Denial of gasoline and tire replacements to cars whose drivers persistently violate the national 35-mile-an-hour speed limit for rubber conservation.

5. Capacity use, through car-sharing, of every car on every trip so far as possible.

Government Buying Surplus Tires

Steps to put the nation's idle passenger car tires to work in the nationwide mileage rationing program, registration for which starts November 9, were announced October 15 by Price Administrator Leon Henderson. They are: (1) Gasoline rations will be issued to private passenger cars only after their owners list all their tires by serial number and certify that they have no more than five tires in their possession for each such car. In all cases falsification of the tire statement becomes an offense punishable by fine of up to $10,000, and a maximum prison term of 10 years. (2) The government, beginning October 15, will start purchasing from car owners at ceiling prices all new or used tires the owners wish to sell.

The program is designed to implement the OPA's efforts to keep all passenger cars rolling for their *essential* mileage through rationing of the smallest possible amount of rubber. The steps announced are intended to build a great national stockpile of new and used tires and recappable carcasses for rationing to auto owners on the basis of need.

The method for selling tires to the government is simple. The Defense Supplies Corp. has advanced $150,000,000 for the purpose and has designated 160 warehouses throughout the country as delivery points. The Railway Express Agency, with 23,000 offices throughout the United States, has been designated to collect tires and transport them to the warehouses. To sell his tires to the government the individual telephones or writes the Railway Express Agency Office nearest his home, and a

CALENDAR

Nov. 3.	Los Angeles Rubber Group. Mayfair Hotel, Los Angeles, Calif.
Nov. 6.	Akron Rubber Group. Akron City Club, Akron, O.
Nov. 6.	S. C. I. Chemical Industry Medal Award to H. E. Howe, Chemists' Club, New York, N. Y.
Nov. 9-13.	American Petroleum Institute. Annual Meeting. Palmer House, Chicago.
Nov. 13.	Rubber & Plastics Division, Montreal Section, S. C. I. McGill University.
Nov. 16-18.	American Institute of Chemical Engineers. Annual Meeting. Netherlands Plaza Hotel, Cincinnati, O.
Nov. 24-29.	National Chemical Exposition and National Industrial Chemical Conference. Chicago Section,
Nov. 27.	Chicago Rubber Group. Sherman Hotel
Nov. 30-Dec. 4.	A.S.M.E. Annual Meeting. New York.
Nov. 30-Dec. 4.	Exposition of Power and Mechanical Engineering. Madison Square Garden, New York.
Dec. 1.	Los Angeles Rubber Group. Mayfair Hotel, Los Angeles, Calif.
Dec. 4.	Rhode Island Rubber Club. Narragansett Hotel, Providence, R. I.
Dec. 16.	Rubber & Plastics Division, Montreal Section, S. C. I. McGill University.
Dec. 18.	Chicago Rubber Group. Christmas Party. Morrison Hotel.

truck will be sent. The owner will be given a receipt for the tire and will receive his check, or war bonds and stamps if he prefers, in payment from the government shortly after the tire has been inspected at the warehouse for official determination of its value. In areas where the Railway Express Agency does not maintain pickup service, the tire owner will take his idle tires to the agency office.

Damaged but repairable tires and tubes will be appraised at their ceiling prices, less cost of repairs. Scrap rubber prices will be paid for any that cannot be made serviceable. Persons owning casings obviously fit only for scrap, should sell them at once to scrap rubber dealers.

Tires that are usable as received will be resold as soon as possible so that they will be in the hands of retailers when rationing of used tires begins. Tires damaged or worn smooth will be repaired and recapped by dealers before they are resold. In either event the ultimate price at which they are sold to the consumer will not be greater than the retail price ceiling. The cost of collecting and redistributing these tires, with resale to the consumer at the same price paid the seller, will be borne by Defense Supplies Corp.

Although gasoline ration eligibility will put a limit only on the number of casings for each car, Defense Supplies is offering a market for tubes as well. Under the restriction orders now in effect, this is the only market in which consumers with usable excess tires may sell. They cannot sell or give away tires or tubes to other consumers or to dealers. Truck and motorcycle tires and tubes also will be purchased by Defense Supplies Corp. if they are offered although there is no compulsion of their sale under gasoline rationing.

Rayon for Tires

The use of rayon as a tire fabric in place of cotton was defended by Mr. Jeffers before the Senate Agriculture Committee where he had been summoned by Senators from cotton states. He bluntly told committee members that no pressure group was going to stop him from doing his job, and if the Army found rayon in heavy-duty tires more serviceable than cotton, then the Army would get rayon. Defying Senate criticism, he has ordered put into effect his program for expanding rayon plants which will enable seven rayon plants, with an expenditure of $5,000,000, to increase facilities to produce the high-tenacity yarn which is claimed to save 650 pounds of rubber for every 1,000 pounds of yarn. While tests of the use of rayon in big Army truck tires have not been completed, results so far have proved high-tensile strength rayon possesses a greater resistance to heat than cotton.

Other Jeffers Recommendations

On October 15, Mr. Jeffers arrived in Akron to make a personal inspection of the synthetic rubber industry, first stopping at Goodyear's government-financed synthetic rubber plant. His two-day itinerary included visits to the Goodrich, Firestone, Seiberling, and General plants.

Mr. Jeffers told reporters that, "if people respond to our requests to go easy on tires, there will be some rubber left over after military needs and essential workers are supplied. We've got to keep this nation on rubber to preserve its economic life."

The six rubber experts mentioned above under the leadership of Colonel Dewey have been instructed to investigate the possibilities of Russian methods of making synthetic rubber. Director Jeffers disclosed that Russian synthetic rubber experts are on their way to the United States and that sample synthetic rubber tires were being shipped for examination over here.

All available sources of synthetic and natural rubber are being investigated by the WPB and the Senate Agriculture Committee who continue to study the possibilities of utilization of California wineries for the production of alcohol for synthetic rubber, and of obtaining the maximum supply of natural rubber from South and Central America.

A rubber-like substance from by-products of dairy processors which is said to be suitable for recapping tires is being experimented with by scientists of the National Dairy Products Corp., New York. Developmental work on the practicability of the product is being done by The B. F. Goodrich Co., but the WPB does not offer the product as providing immediate relief as a rubber substitute, but states, "its potential promise is of value in connection with the long-range program."

Downey Guayule Bill a Law

On October 22, President Roosevelt signed the Downey bill, which amends the Act of March 5 limiting the planting of guayule and other rubber bearing plants to 75,000 acres. The new measure, which was passed by the House on October 8 and then returned to the Senate for action on minor House amendments, authorizes the Department of Agriculture to increase plantings to 500,000 acres, and the $19,000,000 appropriation calls for plantations in California, Arizona, Texas, and New Mexico. Increased output of guayule, incidentally, was one of the recommendations of the Baruch Report.

The Department of Agriculture reported on September 28 that during the past summer 350 million seedlings were produced in the Salinas, Calif., nurseries, enough to plant 32,000 acres during the Fall and Winter of 1942-43. Two new nurseries are being established, near Oceanside and near Indio, both in Calif., each of which will have about 10,000 seedbeds. They will be sown with seed from the Salinas plantation, and the crop, ready to transplant next spring, will supply stock for an additional 56,000 acres. It is also planned to establish a nursery in the Central Valleys before next spring. The Department hopes to have about 208,000 acres of guayule growing by the Spring of 1944. Thereafter stock for about 176,000 acres can be grown annually in these nurseries.

If all plans materialize, rubber production will begin with about 600 tons this fall and should rise to 33,000 tons in the following fall and to 47,000 tons in 1945. If a sustained planting program of 176,000 acres is carried out, and the shrub harvested at the end of two years' growth in the field, it should result in the production of about 80,000 tons of rubber a year.

It is planned to use both irrigated and dry land. Since on the average the former may be expected to produce more rubber in a given length of time, for the time being, at least, the greater part of the acreage will be confined to irrigated land.

The Department has also stated: "The present governmental production is a war effort, aimed entirely at helping to relieve the very critical rubber situation, but it is not beyond the bounds of possibility that it may also result in developing both a permanent at-home source of rubber and a profitable crop for agriculture."

All-Reclaim War Tire

As soon as recommendations of the Baruch Committee for providing relief for tire-starved motorists are officially put into effect, all-reclaim civilian and military tires will roll off production lines of The B. F. Goodrich Co. and Goodyear Tire & Rubber Co., both of Akron, United States Rubber Co., New York, N. Y., and Armstrong Rubber Co., West Haven, Conn. Plans have been completed for quantity production of the new war tire which, it is claimed, will give 10,000 miles if driven at speeds of 35 miles per hour or less. The tire, containing only four ounces of crude rubber used in cementing the plies, is made of reclaim which came from the nation's scrap pile. On the sidewall of the Goodyear tire will be stamped the company name and the words "War Tire", and to each tire will be a tag which informs the purchaser that the tire is made from reclaim and that speeds in excess of 35 miles per hour must be avoided.

Goodyear had announced the production of a regenerated rubber tire last December, which was named "Defense" and featured a "V" in its tread design. Firestone Tire & Rubber Co., Akron, also reported in December the manufacture of a "Victory" passenger-car tire made entirely of reclaimed rubber, which is claimed to give satisfactory service when driven at moderate speeds.

Plasticizers for Synthetic Rubber

Plastoflex #10 and #20 were developed as plasticizers for synthetic rubber from raw materials that are not on priority by the Advance Solvents & Chemical Corp., 245 Fifth Ave., New York, N. Y., and are therefore freely available. These plasticizers are particularly useful for the Buna N type copolymers where they act not only as plasticizers, but also have a pronounced "elasticating" effect. Both are dark-colored liquids with a not unpleasant aromatic odor. Both types of Plastoflex show up exceedingly well in Hycar OR and Perbunan stocks in providing greatly improved rebound without a large loss of tensile strength. Improvement in rebound that can be obtained by the use of these plasticizers in Butyl stocks is often very desirable with this type of rubber.

Baruch Rubber Survey Committee Report—Appendix—II

On October 7 a booklet was issued by the Office of War Information which included in addition to the full report and the digest of the work of this committee, which was submitted to the President in mimeographed form early in September, a comparison of the relative merits of the various synthetic rubbers being produced in the United States today. This comparison was presented in a section entitled Appendix II, "Chemistry of Synthetic Rubber", and opened the discussion with the very important point that: "Strictly speaking, no material has yet been produced which warrants the name of synthetic rubber—at least in the sense in which we speak of many other synthetic substances."

The relation between isoprene, the basic unit of natural rubber and butadiene, chloroprene, and isobutylene, the basic units for the major synthetic rubbers being produced today is explained together with the fact that these synthetic rubbers differ from natural rubber further in being "co-polymers" of two or more basic materials; while natural rubber is considered as being a polymer of one basic material, isoprene. It is also pointed out that isobutylene and butylene (source of butadiene) are both valuable materials for the manufacture of high-quality aviation fuel—high octane gasoline.

In the discussion of the use of alcohol for the production of butadiene noteworthy statements on this controversial issue were: "It should be remarked here that the public discussion of the various processes of manufacturing butadiene from either alcohol or petroleum here has been a tendency to lay altogether too much stress on whether a process involved one step or two steps . . . only a detailed analysis of the very complicated blueprints of the plant layout enable one to pass judgment on the comparative simplicity and merits of the operation."

In a final summary of the properties of the various synthetic rubbers it is stated that tires up to size 7.00 can be made from Buna S rubber alone, but that larger truck, heavy-duty, and combat sizes require 20% of crude rubber at present although it is hoped that this may be reduced to 10%. Neoprene is classified as excellent for heavy duty tires, "being equivalent to natural rubber in ordinary service and definitely superior to natural rubber when run over ground containing flinty or other sharp materials likely to damage tires."

An important advance in the art of compounding Butyl rubber is reported in that it may now be mixed and cured with natural rubber, Buna S, or neoprene. The field of usefulness of this rubber is therefore greatly expanded since it can be mixed with these other rubbers in the manufacture of tires and other articles, and it is now available as a recapping material for tires. The introduction of "Thiokol" into the rubber program is explained on the basis of its ease of production and its resistance to oils and other chemicals that attack natural rubber. Its major use as a recapping material to supplement our supply of reclaimed rubber is indicated.

The report is concluded with a chart comparing various synthetics and reclaimed rubber with crude rubber as a tire and recap material. Manufacturing efficiency, tread wear, carcass failures, suitability as a recap are the points covered, and comments on suitability of the various rubbers for inner tubes are also made.

Quaker Oats Co. in Synthetic Program

A plant to produce furfural at the rate of about 12,000 tons a year has been authorized by the Rubber Reserve Co. and will be constructed in the Southeast. It will be built by the Defense Plant Corp. and operated by the Q-O Chemical Co., a subsidiary of the Quaker Oats Co. Facts revealed in WPB General Preference Order M-224 indicated that furfural had been placed under restrictions for delivery or acceptance because of its anticipated use as a selective solvent for use in the various stages of the manufacture of butadiene.

The one plant now in operation in the country is turning out this material at a rate about 25% in excess of 1942 requirements, but 1943 requirements will be about five times as great as in 1942. The new plant is being constructed to provide for all anticipated needs of the synthetic rubber program.

Theoretically, furfural can be made from any vegetable material, but the richest sources of it are oat hulls, cotton seed hulls, and corn cobs. Since one of the greatest problems in the manufacture of large amounts of this material is the collection of raw material (one pound of furfural requires about 10 pounds of these raw materials), the new plant is being located at a spot most advantageous for the collection of the necessary materials.

Navy Rubber Survey Committee

Following recommendation of William M. Jeffers, United States Rubber Director, and in cooperation with his office, the Navy Department has set up under the direction of Under Secretary of the Navy James Forrestal a Navy Rubber Survey Committee headed by Arthur M. Hill, president of the Atlantic Greyhound Lines, to survey the extensive rubber conservation measures already taken by all branches of the Navy, coordinate them, and determine what further steps can be taken along this line. Vice chairman of the committee is O. S. Caesar, vice president of Greyhound Corp. Other members of the committee will be outstanding technical rubber experts now being selected by Mr. Hill.

Lt. Leonard K. Firestone, U.S.N.R., has been assigned as liaison between the committee and the various bureaus and other branches of the Navy Department. Lieutenant Firestone is a son of Harvey S. Firestone, founder of the Firestone Tire & Rubber Co., Akron, O., and prior to being called to active duty with the Navy held an administrative position with that company.

By substituting less critical materials, the Navy has already reduced the amount of rubber required in the construction of combatant vessels to one-half the normal allotments before December 7, 1941. Similar drastic curtailments in the use of rubber have been made in other items of Naval equipment, such as gas masks. Despite the fact that the Navy's building program is greatly expanded, this larger program is consuming 35% less rubber in 1942 than the pre-war program consumed in 1941. Present Navy rubber conservation measures were taken under a directive of Under Secretary Forrestal issued shortly after the United States entered the war.

The survey, according to Mr. Hill, will be on a practical, rather than a theoretical basis, and will have as its objective "to conserve the use of rubber in the Navy to the fullest without sacrificing efficiency."

Board of Economic Warfare, Office of Exports, Washington, D. C., in "Current Controls Bulletin No. 53", October 21, states that a single application for export license will suffice for related commodities when destined to but one consignee for use in one country. Products are placed in related commodity groupings, and any combination of commodities within one of the numbered groups may be entered on a single export license application. Groupings for rubber and manufactures follow: (34) rubberized automobile cloth, other rubberized piece goods and hospital sheeting, rubber soling and top lift sheets, mats, matting, flooring, and tiling; (35) clothing of rubber or of rubberized cloth, boots, rubber shoes, canvas shoes with rubber soles, rubber soles, rubber heels, rubber gloves and mittens, rubber balloons, rubber toys and balls, bathing caps, rubber bands, rubber erasers; (36) druggists' rubber sundries; (37) all hard rubber goods.

Major Wendell Dove, a rubber expert in Latin America for 15 years, who last month completed a survey for the Rubber Reserve Co. and the Office of the Coordinator for Inter-American Affairs, told a Senate agricultural subcommittee, headed by Senator Gillette, in closed session October 8 that the United States must scrap and renegotiate existing agreements with Latin American countries if a minimum sustained supply of crude rubber is hoped for from these countries.

The Brake Lining Manufacturers' Association, Inc., 370 Lexington Ave., New York, N. Y., at its annual meeting, October 7, elected the following officers: president, D. H. Spicer, World Bestos Corp.; first vice president, T. L. Gatke, Gatke Corp.; second vice president, C. Q. Smith, American Brakeblok Division, American Brake Shoe & Fdry. Co.; treasurer, J. S. Doyle, Johns-Manville Corp.; secretary and assistant treasurer, H. G. Duschek, Brake Lining Manufacturers Ass'n; executive committee, W. E. Harvey, Thermoid Co.; J. G. Brown, Grizzly Mfg. Co.; M. M. Monroe, Inland Manufacturing Division of General Motors Corp.; R. B. Davis, Raybestos Division of Raybestos-Manhattan, Inc., and A. P. Smith, Russell Mfg. Co.

Used Tires and Tubes and Certain Footwear Rationed; Other OPA News

Under Amendment 34 to the Revised Tire Rationing Regulations, issued October 1 and effective the same day, the Office of Price Administration froze the sale of used tires and tubes and also announced that used tires would be rationed to comply with the Baruch Committee's recommendation of providing tires for all essential uses. The freeze was adopted to keep intact the supply of used tires pending completion of the rationing program, following adoption of which the freeze order will be lifted to the extent necessary to permit sale to certificate holders. It is important to have available for rationing not only the mileage represented by used tires with good tread thicknesses, but also a supply of recappable carcasses. Shortage of such carcasses already has hampered the present tire rationing program.

There are exceptions to the freeze order. Thus an automobile equipped with used tires may be sold to a consumer; or an automobile dealer may shift mounted used tires among his cars, but unmounted tires, as of September 30, may not be put on the dealer's cars. Provision is also made for transfers between a recapper and a consumer in getting a tire recapped, between a dealer and a consumer having it repaired, or from a dealer to a recapper. In special cases where the movement of used tires or tubes is necessary in the interest of rubber conservation, permission may be granted on application to the OPA state director in the state where the stock to be moved is located.

The OPA plans a series of meetings between its representatives and tire dealers and recappers in 40 cities between October 28 and November 20 to give dealers a thorough understanding of the price regulations governing new and used tires and tubes, recapped tires, and recapping services.

Orders Affecting Footwear

Supplementary Directive 1-N, issued by the WPB September 29, delegates to the OPA authority to ration rubber footwear.

The OPA ordered on September 29, under Ration Order 6—Men's Rubber Boots and Rubber Work Shoes Rationing Regulations—certificate rationing of men's rubber boots and rubber work shoes and froze all sales and shipments of six types of boots and work shoes to prevent a buyers' "run" on the stocks on hand and to give dealers time to take inventory. Rationing to customers began October 5 on the footwear requiring high crude rubber content: hip-height rubber boots, including all boots of hip, body, and thigh heights; over-the-knee rubber boots, including Storm King height; all short boots; rubber pacs, bootees, and work shoes; rubber pacs and bootees 10 inches or more in height. Sales of the rationed footwear are restricted to those who must wear it to work on essential jobs and to companies which furnish it to their employes on essential jobs where such footwear is necessary. Rubber footwear for ordinary wear made mostly from reclaimed rubber is not rationed, and included in this class are men's rubber boots and rubber work shoes smaller than size 6, lumbermen's overs (leather boot with rubber foot), men's arctics, gaiters, work and dress rubbers, and women's and children's rubber boots, rubber work shoes, arctics, gaiters, and rubbers.

Inventories of stock on October 3 of the rationed footwear are required and must have been filed by October 11 with local War Price and Rationing Boards. During the first 60 days following the effective date of Ration Order No. 6, there will be a period during which manufacturers and distributers may ship to customers without collecting certificates. This certificate-free period provides leeway to take care of ordinary seasonal stocking up and to facilitate stock adjustments within the trade. Sales of the rationed footwear to consumers, however, may be made only to certificate holders.

Amendment 1 to Ration Order 6, issued and effective October 6, provides that crew members of ocean going vessels may purchase rationed rubber footwear on board without a certificate and that the owner or the operator of such a ship may replenish his supplies without the need of presenting a rationing certificate to his supplier. Further instructions are given for the latter to replenish his own inventories.

The second amendment to Ration Order 6, effective October 15, now requires that all consumer sales, even by mail order, may be made only to persons who surrender ration certificates. This ruling eliminates the special provision in the original order allowing for time to take care of footwear orders actually in the mails before freezing of sales began, September 29.

Amendment 2 to Maximum Price Regulation 200—Rubber Heels, Rubber Heels Attached, and Attaching of Rubber Heels—issued October 1 and effective October 7, revises upward ceiling prices which shoe repairmen may charge for attaching rubber toplifts to women's shoes. However eliminated is a previously permitted extra service charge for repairs made to the heel in the attaching process; the two charges are now combined. The range of prices is now 25 to 40¢ as against the previous 20 to 30¢ plus a 10¢ repair charge. Similar adjustments are made for women's rubber cuban heels. Maximum prices for rubber heels sold by one wholesaler to another under certain conditions are also provided for. Other subjects covered are approval of two methods of marking women's toplifts to indicate the physical tests they are able to meet; change of unit of sales from wholesaler to repairman from one dozen pairs to one dozen; adjustment of maximum prices for men's and women's combination rubber and leather toplifts; reclassification as to grade of two brands of heels; lowering of the minimum abrasion ratings required of whole heels to enable them to fall within various price classifications.

Maximum Price Regulation 229—Retail and Wholesale Prices for Victory Line Waterproof Rubber Footwear—effective September 29, sets forth maximum prices for the new Victory line of waterproof rubber footwear, produced under a WPB order limiting the use of crude rubber in such items, including heavy occupational rubber footwear as well as ordinary civilian articles. These prices supersede those established for such footwear in the General Maximum Price Regulation.

Amendment 1 to MPR 229, also effective September 29, adds the words "per pair" to "Appendix A: Table of Maximum Prices of Victory Line Footwear."

William W. Stephenson was appointed chief of the rubber footwear branch of the OPA's Miscellaneous Products Rationing Division. Since 1923 Mr. Stephenson has been engaged in selling and managerial capacities in the rubber footwear business, mainly as manager in charge of the Syracuse and Buffalo districts of the United States Rubber Co., New York, and as manager of Goodyear Glove Rubber Co., Cleveland, O.; in 1932 he handled the liquidation of the Marion Rubber Co., Columbus, O.

More on Tire Rationing

Several additional amendments have been added to the Revised Tire Rationing Regulations. No. 28, issued September 26 and effective October 2, provides means whereby new tires of sizes that fit only the older models of passenger cars are rationed to eligible vehicle operators before the tires deteriorate in storage or before the cars that can use them wear out. The list of obsolete tires has been expanded to include all new passenger-car tires fitting rims 18 inches or more in diameter (1934 car models and older) and tires used on motorcycles made before 1937. Amendment 29, issued September 26 and effective October 2, adds to the eligibles list dental surgeons, itinerant dentists and midwives who must drive cars in the performance of their duties. The next amendment, also issued September 26 and effective October 2, puts on the list of services which may be performed on rationed tires ("A" eligibility list, vehicles engaged in the most essential transportation functions): vehicles (1) to evacuate civilians from danger zones or places where they might interfere with military operations; (2) to transport a jury at the written request of the presiding judge of the court the jury is serving; (3) to transport prisoners or mentally deranged upon written request of their official custodians; (4) to transport persons between their homes and places of worship for regular services, where no other adequate transportation facilities exist. Amendment 31, issued September 28 and effective October 3, allows certain persons with stocks of new tires or tubes, recapped tires, or recapping material in public warehouses to remove them without special authorization, and also permits the owner of such material to pledge it as security for a loan from an authorized agency. No. 32, issued September 29 and effective October 5, makes eligible for recapped tires representatives of labor, management, or government whose services are essential in labor disputes in essential war industries or who need passenger cars to transport workers to such establishments. Amendment 33, issued October 2 and effective the eighth, makes eligible for recaps American Red Cross passenger cars

essential to the war effort and public health; also eligible are trucks used alternately as buses in certain services. The next amendment relates to the freezing of sales of used tires and tubes. No. 35, issued and effective October 5, changes the form of tire rationing certificates issued to consumers and simplifies procedure. Amendment 36, issued October 6 and effective October 12, revises regulations relating to getting and using camelback on the part of retreaders and recappers. The next amendment, issued October 7 and effective October 13, makes eligible for recapped tires or Grade II new tires cars of all members of a group-ride "club" in any war-essential establishment employing more than 100 persons. The thirty-eighth amendment, issued October 17 and effective three days later, indicates that under certain conditions any passenger tire recapping quota remaining unused after the twentieth of the month will be available for careful rationing to drivers regularly carrying other passengers to and from work in a group-ride or share-ride arrangement.

Quota Statistics for October—November

A supplementary recapping quota of 482,379 recaps for passenger car tires in October, slightly more than doubling the 457,561 already provided for the month and making a total of 939,940 available was announced October 1 by OPA, which then urged all passenger-car operators eligible under tire rationing regulations, whose casings are worn smooth, to apply immediately for recapping certificates to preserve the tire carcasses. This step, one of a series taken recently by OPA to comply with tire conservation recommendations of the Baruch Committee, not only gave local War Price and Rationing Boards enough quota to permit the granting of certificates for valid applications carried over from the previous month, but provided for eligible applicants who may have delayed applying.

With recapping likely to increase as more and more tires used on essential vehicles wear smooth, it is important to get as much as possible done now, the Office of Price Administration pointed out, to avoid future pressure on the limited supply of recapping facilities.

There was no increase made in the passenger-car tube quota, as it is believed that in most cases tubes now in use can be kept in service.

A quota of 1,090,206 passenger-car recapped tires and recapping services for rationing in November (see page 194) was announced October 26. This increase, besides a boost to 134,470 from 98,755 in the quota of Grade II new tires available certain classes of war workers when their casings are not recappable, reflects two substantial expansions in the eligibility lists announced last month.

The November quota of new passenger-car tires for rationing to eligibles on List A is 60,513, against 60,676 in October. The passenger-car inner tube quota has been reduced to 148,037 from 315,138, and local boards are instructed to make absolutely sure that certificates for tubes are not issued unless an applicant's old tubes are utterly beyond repair. If the tube quota proves inadequate, however, it may be supplemented later.

November truck tire quotas are smaller than those for October, following a seasonal pattern of declining replacement sales in fall and winter. The quota is 179,460, compared with 202,840 for October, with a recap allotment of 196,708, against 238,973, and a tube quota of 194,062, against 225,620.

Other Price Rulings

Amendment No. 30 to Supplementary Regulation 1 of the General Maximum Price Regulation, issued September 28 and effective October 3, exempts from price control agricultural components of furfural, used in making butadiene for synthetic rubber, in refining petroleum crudes, and as a plastic binder.

Rates, fees, charges, or compensation for services in converting raw materials supplied by a customer into synthetic rubber were exempted from the General Maximum Price Regulation and Maximum Price Regulation No. 165 (Services) by Amendment 4 to Revised Supplementary Regulation 11 of General Maximum Price Regulation, issued September 29, and effective October 5. This action follows OPA's policy of permitting complete price flexibility during the formative stages of the synthetic rubber industry.

Order 76 under § 1499.3 (b) of the General Maximum Price Regulation, issued September 24 and effective the next day, gives a formula for use by Tyer Rubber Co. to determine the maximum price for a politzer syringe made of neoprene instead of the natural rubber previously used.

Amendment No. 31 to Maximum Price Regulation No. 136, as Amended—Machines and Parts and Machinery Services—issued October 15 and effective November 7, sets ceiling prices of electric storage batteries sold by manufacturers and wholesalers as follows: (1) for storage batteries for replacement use in automobiles and trucks, 1¢ a pound of lead content above the seller's price on October 1, 1941, but in no case may the ceiling exceed the highest price charged in March, 1942; (2) for all other electric storage batteries, the seller's price on October 1, 1941.

OPA stated October 8 that manufacturers' prices of apparel items containing rubber or elastic webbing as a component material—such as corsets, girdles, suspenders, elastic-top hosiery, bloomers, panties, shorts, drawers, pajamas, and gloves—are included in Maximum Price Regulation No. 220 (Certain Rubber Commodities), which provides methods whereby manufacturers can readily determine the maximum prices they may charge for certain commodities containing rubber. Manufacturers thus no longer need apply to OPA for a pricing method on new merchandise which cannot be priced under the regular formulas of the General Maximum Price Regulation. When any article no longer contains rubber or synthetic rubber, Regulation 220 will not apply for its pricing. OPA said the effect of the regulation on wearing apparel may therefore be considered temporary.

WPB Announcements

Further control of the tire retreading industry has been established by an amendment to Order No. L-61, issued October 10, restricting the production and distribution of a number of additional machinery and equipment items essential to the industry. The original order controlled production and distribution only of full-circle molds, matrices, holders, tables, steam chambers, kettle curing devices, curing rings, bands, and pressure plates. The present amendment extends the control of production and distribution to sectional molds and matrices, repair and spot equipment, tire spreaders, tire buffers, spacer rings, curing rims, mechanical stitches, rollers and regroovers. No items on the list may be produced, except to fill orders rated A-9 or higher on a Preference Rating Certificate PD-1A or PD-1X, or forms of the PD-408 series. The order and the amendment also provide that no manufacturer or distributer of retreading, recapping, and repair equipment or parts therefor, may sell, lease, rent, deliver, or otherwise transfer any new equipment or parts except to fill orders rated A-9 or higher on a Preference Rating Certificate PD-1A or PD-1X, or forms of the PD-408 series.

The tire retreading and recapping equipment industry is composed of approximately 25 companies. It manufactures the equipment listed in the order and the amendment for military, Lend-Lease, and essential civilian requirements. WPB officials point out that while it is necessary to continue the production of this equipment to advance the war effort, the manufacture of unnecessary facilities must be limited. The major metals conserved by Limitation Order No. L-61 and the present amendment are steel, copper, brass and Grade 12 remelt aluminum.

The WPB has announced that after October 8 the entire production of the nation's distilled spirits industry would be changed over to war production of alcohol, used to make smokeless powder and as a source of butadiene. Conversion of the industry will help solve the distilling material shortage by its use of surplus grain.

Committee Appointments

The WPB has appointed a committee of engineers and scientists to determine the scope, functions, and method of operations of the projected Office of Technical Development. Decision to establish such an office was adopted to make sure the nation's technical ability and resources are utilized to the full in the war production program. Committee chairman is Webster N. Jones, Carnegie Institute of Technology, Pittsburgh, Pa. Members include: Lawrence W. Bass, New England Industrial Research Foundation, Boston, Mass.; Oliver E. Buckley, Bell Telephone Laboratories, New York, N. Y.; Colonel Clarence E. Davies, United States Army, Washington, D. C.; Ray P. Dinsmore, Goodyear Tire & Rubber Co., Akron, O.; Admiral J. A. Furer, United States Navy, Washington; Jerome C. Hunsaker, Massachusetts Institute of Technology, Cambridge, Mass.; H. W. Graham, Jones &

Laughlin Steel Corp., Pittsburgh; and S. D. Kirkpatrick, *Chemical and Metallurgical Engineering*, New York.

An advisory committee for the vinyl resins producers industry has been announced, with Frank H. Carman, chief, Plastics and Synthetic Rubber Section, Chemicals Branch, as government presiding officer. Members of the committee include: H. S. Bunn, Carbide & Carbon Chemicals Corp., New York, N. Y.; L. F. Loutrel, Shawinigan Products Corp., New York; John C. Brooks, Monsanto Chemical Co., Springfield, Mass.; A. E. Pitcher, E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.; J. R. Hoover, B. F. Goodrich Co., Akron, O.; Bradley Dewey, Dewey & Almy Chemical Co., Inc., Cambridge, Mass.; W. C. Goggin, Dow Chemical Co., Midland, Mich.; and Henry B. Townsend, General Latex & Chemical Corp., Cambridge.

Wm. E. Taggart, manager, tube sales, The Timken Roller Bearing Co., Canton, O., is on the Tubing Subcommittee of the Tubular Industry Advisory Committee.

The abrasive industry also has an advisory committee, including among its members Arthur Batts, Carborundum Co., Niagara Falls, N. Y.; R. R. Cole, Monsanto Chemical Co., St. Louis, Mo.; C. N. Jeppson, Norton Co., Worcester, Mass.; J. Kuzmick, Manhattan Rubber Mfg. Division Raybestos Manhattan, Inc., Passaic, N. J.; and W. L. McKnight, Minnesota Mining & Mfg. Co., St. Paul, Minn.

The Titanium Pigment Industry Advisory Committee, with E. H. Bucy, chief of the Protective Coatings Section of the Chemicals Branch, as government presiding officer, consists of Paul E. Sprague, American Zirconium Co., Cleveland, O.; John Allegaert, United Color & Pigment Co., Newark, N. J.; J. F. Daley, E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.; D. W. Robertson, Titanium Pigment Corp., New York, N. Y.

Members of the Specification & Testing Industry Advisory Committee include J. F. D. Rohrback, Raybestos-Manhattan, Inc., Passaic, N. J., and L. J. Silverman, Union Asbestos & Rubber Co., Chicago, Ill. Government presiding officer is Fred W. Gardner, chief, Cork-Asbestos Branch.

Among the personnel of the Pyroxylin & Vinyl Resin Coated Paper and Fabrics Industry Advisory Committee are G. M. Jackson, Western Shade Cloth Co., Chicago, Ill.; J. C. Lippmann, Testileather Corp., Toledo, O.; and F. F. Sommers, Chicago Rubber Clothing Co., Racine, Wis. Mr. Bucy is government presiding officer of this committee also.

E. H. Austin, of Timken Roller Bearing Co., Canton, O., is on the Automotive Replacement Parts Industry Advisory Committee (Anti-Friction Bearings Subcommittee).

J. A. Krug, Deputy Director General for Priorities Control, has announced the organization of a Bureau of Priorities Control. Within the Bureau, as now established, will be four divisions: Materials Control, Priorities Review, Compliance, Foreign; the office of the deputy director; an appeals board; and a clearance committee. Edward Falck will serve as Assistant Deputy Director General under Mr. Krug.

Responsibility for all transportation priorities, domestic as well as import, have been consolidated in a new Division of Stockpiling and Transportation, which also has authority to advise the ODT as to the issuance of directives with respect to the relative importance of commodities for storage. Creation of the new division centralizes all functions and responsibilities of WPB relating to import priorities, stockpiling, stock protection, storage, and domestic transportation by all methods.

Synthetic Rubber Data Available

The WPB Synthetic Rubber Educational Committee (H. E. Simmons, chairman) is accumulating a small library of data supplied by the industry relative to the processing and compounding of synthetic rubber. Some of this information has been edited for technical releases to the industry, but no attempt will be made to release all of it. All of the information, however, is available in Washington to anyone in the industry who has need of it, and such visitors will be welcome. The address is Room 5025, Municipal Center Building, 4th and D Streets, N. W.

October Chemical Allocations Outlined

The Chemicals Branch, WPB, released an outline of the allocations made in October for materials not being used for military purposes. Of interest to the rubber industry are the requests for chemicals which were granted in full, comprising naphthenic acid and naphthenates—rubber plasticizers and softeners; anhydrous ammonia—rubber and plastics; aqua ammonia—plastics and resins, pyridine recovery, hexamethylenetetramine, insulation; aromatic petroleum products—rubber preservative compounds; benzol—manufacture of styrene; phthalic anhydride—rubber chemicals; vinyl chloride, polymers and co-polymers—substitute for rubber cable and wire insulation for essential industrial use, chemical resistant protective coatings, sheetings for hospitals and mortuaries, essential hospital supplies, dentures; pyridine—rubber accelerators.

Requests granted in part include: furfural—resins on basis of August, 1942, consumption; toluene—rubber accelerators 57%.

Those denied in full include tricresyl and triphenyl phosphate plasticizers—synthetic rubber; vinyl chloride, polymers and copolymers—S.N. code wire in open knob tube, or cleat wiring, name plates, instruction plates, dials, belts, suspenders, wallets and tobacco pouches, uniform hat covers, dish covers, identification tag cord, civilian waterproof coating, stiffening agent for collars, mending tape, civilian watch crystals, bookbindings, shampoo capes, combs, draftsmen's supplies, toothbrush handles, shower curtains, flashing, fountain pen and pencil parts, and beverage tubing.

The Society of Chemical Industry, 305 Washington St., Brooklyn, N. Y., has awarded the 1943 Perkin Medal to Robert E. Wilson, president of Pan American Petroleum & Transport Co. Presentation will take place January 8, 1943, at a meeting scheduled for The Chemists' Club, 52 E. 41st St., New York, N. Y.

MIDWEST

Monsanto Chemical Co., St. Louis, Mo., Organic Chemicals Division, has added to its staff Charles W. Rippie, formerly with Solvay Sales Corp., to handle technical sales work in the petroleum chemicals department. James A. Wilson has been made assistant plant manager of the Trenton, Mich., plant; while Eugene M. Hetzel will succeed Mr. Wilson as superintendent of the Carondelet, Mo., plant.

Thirty-nine rubber firms in the Midwest recently employed 21,695 workers, who received $897,000 in wages, respective gains of 8.4% and 15.7% over the previous month.

I. Drogin, director of research, United Carbon Co., Charleston, W. Va., talked on "Synthetic Rubbers and Their Reenforcement by Carbon Blacks" at the Illinois Institute of Technology, Chicago, Ill., before a large group attending a course in synthetic rubber. The course is part of the Engineering Science Management War Training Program under the auspices of the United States Department of Education and is in charge of H. A. Winkelmann, technical director, Dryden Rubber Co., Chicago.

The American Resinous Chemicals Corp., Peabody, Mass., will have an exhibit at the National Chemical Exposition to be held at the Sherman Hotel, Chicago, Ill., November 24-29, under the auspices of the Chicago Section, A. C. S. William Lewis and other officials of the company will be in attendance.

N. S. C. Congress and Exposition

The thirty-first National Safety Congress and Exposition sponsored by the National Safety Council, Inc., 20 N. Wacker Dr., Chicago, Ill., was held at the Sherman Hotel, Chicago, October 27-29. The scheduled program for the Rubber Section on October 27 was opened with a report on sectional activities by General Chairman Ralph S. Farnum, United States Rubber Co., Detroit, Mich., followed by "All Out for Safety" by Paul Van Cleef, Van Cleef Bros., Chicago; "Shielding the Plant and Personnel against War Hazards in the Rubber Industry" (speaker to be announced), with discussions led by J. E. Lovas, U. S. Rubber, Passaic, N. J., and J. L. Grider, American Hard Rubber Co., Butler, N. J.; "Dropping Incendiaries" (motion picture), F. J. Emmonds, Associated Factory Mutual Fire Insurance Cos., Chicago; luncheon; election of officers; 1941-42 Safety Contest—Rubber Section, "Outstanding Facts", R. Kastell, U. S. Rubber, New York, N. Y., presentation of awards, and an address (speaker to be announced). The afternoon program was devoted to a symposium on "The Effect of Lengthened Hours on Safety Problems in the Rubber Industry" with C. W. Ufford, Barrington Associates, New York, presiding. (Participants to be announced.)

Among the listed speakers at the Chemical Section meeting, October 27, was E. J. Meyers, of E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., whose topic was "The Use of Conductive Flooring and Materials for the Elimination of Static Electricity." Mr. Meyers and H. L. Miner, also of du Pont, were among those participating in the round table discussion of chemical industry safety problems.

The Public Utilities Section held a symposium on October 29 devoted to war problems for the public utilities safety engineer, during which T. R. Claffy, of W. H. Salisbury & Co., Chicago, was concerned with rubber goods.

The Safety Engineering Exchange, October 29, taken up with questions and answers, had H. F. Gilbert, of American Cyanamid Co., New York, as one of the panel members.

F. J. Pavlis, of The Flintkote Co., East Rutherford, N. J., at the Safety in Foremanship session, October 29, spoke on "The Foreman Teaches Safety."

Among the exhibitors at the Safety Exposition were du Pont; Lima Cord Sole & Heel Co., Lima, O.; Melflex Products Co., Akron, O.; Mine Safety Appliances Co., Pittsburgh, Pa.; Panther-Panco Rubber Co., Inc., Chelsea, Mass.; W. H. Salisbury & Co.; and Willson Products, Inc., Reading, Pa.

On October 28 a tour of Underwriters' Laboratories main testing station at 207 East Ohio St., Chicago, was arranged and included a discussion and demonstration of requirements and tests for conductive rubber products for elimination of static hazard.

NEW ENGLAND

The Connecticut Hard Rubber Co., 407 East St., New Haven, Conn., has announced that R. S. Aries, formerly associated with a research project of the Northwood Chemical Co. at Polytechnic Institute of Brooklyn, Brooklyn, N. Y., has joined the organization as chemical engineer in the division of plastic research. B. J. Humphrey, formerly in charge of the organic research division in the research laboratory of the Firestone Tire & Rubber Co., Akron, O., has also been added as assistant director of research.

Rhode Island rubber manufacturers during September employed 4,780 workers, against 4,695 in August and 4,818 in September, 1941. Wages for September, 1942, totaled $333,419, 1.2% above the August figure, but 31.9% under September, 1941, payrolls. Respective figures for kilowatt hours used follow: 2,023,000; 1,973,000; and 2,959,000.

Firestone Rubber & Latex Products Co., Fall River, Mass., last month signed a contract with the Rubber Workers Union of America relating to hourly wage rates, seniority rating of employes called to the colors, and settlement of grievances.

New Reclaiming Process Aids War Effort

Impressive rumors backed by a certain amount of factual information have been circulating in the rubber industry for some time past regarding what is described as a revolutionary reclaiming process developed by chemists of the Boston Woven Hose & Rubber Co., Cambridge, Mass., but only recently has it been possible for rather limited information to be released by officials of that company.

It will be remembered that John M. Bierer, factory manager of the company, was scheduled to deliver a paper on the new process at the meeting of the American Chemical Society, Division of Rubber Chemistry, in Buffalo in September, but the talk was cancelled at the request of the WPB. Since that time a number of tests of the quality of the new reclaim for tires and other purposes have been made, and in every case the claims of the sponsors have been borne out.

The basis of the process is a new reclaiming compound, the composition of which cannot be revealed at present. In operation the scrap is ground finely and then milled at a low temperature not exceeding 150° F. The production of the reclaim from the scrap requires only from 12 to 15 minutes. This compares with as long as 20 hours required for the digesting process common in most reclaiming plants and with temperatures as high as 400° F.

John M. Bierer *(Left)* and a Workman Inspecting Sheets of Reclaim Produced Under the New Process

J. P. Coe *(Right)* and John M. Bierer *(Left)* Examining a Reclaimed Tire after a Test Run: the Upper Portion Was Recapped with Ordinary Reclaim, the Lower with the Boston Woven Hose Reclaim

It is claimed that the low temperature of the new process preserves the original qualities of the crude rubber stock to a remarkable degree. For instance, when scrap from an original rubber compound which had a tensile of 4,800 is reclaimed, it loses only one-fourth of its strength and suffers only a comparable percentage of loss on second and third reclaimings. This compared with materially higher losses in other reclaiming methods. Another important feature about the new process that should not be overlooked is that existing equipment of grinders and mills are all that is required, and there will be no new demands on critical materials for new machinery.

What is considered particularly important about the new process is that it can reclaim scorched stock with very slight reduction in its original qualities and make such material quickly available in the plant itself, for reprocessing.

Careful and exhaustive road tests of tires were made recently. The test tires were made with one half section of the Boston Woven Hose reclaim, and the other half with WPB specified "F" grade recapping material made by a prominent reclaimer for use in manufacturing recaps for the tires of doctors, defense workers, and others to whom such recaps are allocated.

The test tires were recapped with special permission of the OPA, and special gas rationing books were issued to permit use of the cars covering the 6,000 miles of road driving required. After the mileage had been covered at 40 miles per hour or less, it was found that the tire sections using the "F" grade of recapping material had been worn smooth; while the tread on the sections of the tire recapped with the new reclaim had been worn so little that they appeared good for at least another 6,000 miles or better. Further tests are now being conducted with tires recapped one half with the new reclaim and the other half with standard reclaim containing 35% of new rubber, to determine relative wearing qualities.

Rubber heels made entirely of the new reclaim and others containing 35% of new rubber were tested under similar conditions and over corresponding periods with the result that both wore equally well.

The new secret formula has been patented by the Boston Woven Hose & Rubber Co., and the ingredients have been made known only to company executives, the War Production Board, and to the larger reclaiming companies in the country. The new process was described in detail by Mr. Bierer at a recent closed meeting of the Rubber Reclaimers Association in New York. The use of the process to the country's reclaimers is granted by the patent owners without royalties for the

duration of the war as a step in helping solve the existing rubber supply problem.

Farrel-Birmingham Co., Inc., Ansonia, Conn., last month through President Nelson W. Pickering announced completion of its new plant at Buffalo, N. Y. The new structure, virtually a duplicate of the company's original building in Buffalo and now operating in conjunction with it, contains 150,000 square feet and is 45 feet high in the center and 35 feet on each side. It consists of four 50-foot bays 600 feet long and two lean-to's 22 by 600 feet long, built around the gear machines which Farrel uses in the manufacture of its products. Mercury vapor lamps and incandescent lamps are used for general lighting, with special concentrated facilities provided for each machine. Vice President A. G. Kessler is manager of the Buffalo plant, and Lester D. Chirgwin, assistant general manager.

Jenkins Bros., Bridgeport, Conn., has named Charles C. Chamberlain as general sales manager. He joined Jenkins Bros. in 1929, became advertising manager in 1932, and publicity manager in 1940. Mr. Chamberlain will make his headquarters at the company's general offices at 80 White St., New York, N. Y.

Cambridge Rubber Co., footwear manufacturer, Cambridge, Mass., last month suffered a loss of several thousand dollars due to a fire caused by excessive heat in the drier. Although several hundred pairs of rubber overshoes and many aluminum lasts were destroyed, operations were not interfered with.

Federal Products Corp., 1144 Eddy St., Providence, R. I., has advanced Fred C. Tanner, vice president and formerly manager of engineering sales, to the position of general manager.

Anaconda Wire & Cable Co., Pawtucket, R. I., branch, gave a dinner to more than 650 employes, including many now in the service, at the Narragansett Hotel, Providence, October 7. Other guests were executives from the plant at Hastings-on-Hudson, N. Y., and the New York, N. Y., offices as well as officials representing the International Brotherhood of Electrical Workers. The dinner was a substitute for the annual summer outing abandoned this year to save tires and gasoline.

Lieutenant Commander Edmund Billings, since 1934 vice president of Godfrey L. Cabot, Inc., Boston, Mass., has been reported missing in action by the Navy Department. When last heard from he was aboard the United States cruiser *Quincy*. During the first World War he served in the Chemical Warfare Department of the U. S. Army. In 1923, Mr. Billings joined Cabot as sales manager and was elected a director in 1930. He was born in Boston, September 9, 1897, attended Roxbury Latin School, and was graduated from Harvard University in 1919. He married Elise Garceau in 1920. They have four children, Elisabeth, 20, Edmund, Jr., 19, Curtis, 17, and Robert, 9, and reside at Concord, Mass.

J. E. Purdy Co., Inc.
Edmund Billings

OHIO

Goodrich Activities

The B. F. Goodrich Co., Akron, through G. E. Brunner, general manager of the national sales and service division, has announced the establishment of a new sales district for the Pacific Coast area, except Seattle, with headquarters in Los Angeles, Calif. Donald W. Fairbairn, from 1926 to 1941 sales engineer for the Goodrich industrial products division in Detroit, was named district manager; for the past year he had worked on problems connected with rubber tracks on military vehicles.

William R. Edwards, formerly salesman in the industrial products division, succeeds Mr. Fairbairn on rubber tracks, with H. V. Dwight, formerly technical representative in the Washington office, sales engineer on rubber tracks. W. B. Collier was made sales engineer on fuel cells. H. V. Kidwell was assigned to the ordnance department in the Detroit district, and L. I. Gibbons was transferred to the company's field engineering department with headquarters also in Detroit. R. A. Maxwell is new staff man on all tire problems other than aeronautical.

A new administrator has been named to Goodrich's War Production Drive and a director to its rapidly expanding suggestion program, it was announced last month by J. B. Hanan, chairman of the Drive's executive committee. New administrator, succeeding A. J. Baker, now manager of factory personnel, is Preston Bergin, of the public relations department. J. J. Feeley, for 26 years with the labor department, is head of the suggestion program.

The Koroseal Division recently added to its staff Grant W. Smith, formerly assistant professor of chemistry at the University of Kansas City, who will engage in polymerization research.

John L. Collyer, Goodrich president, was the principal speaker at the dedication ceremony of Olin Hall of Chemical Engineering at Cornell University, Ithaca, N. Y., October 3.

Goodrich is also making an endless-band type of track in which steel cables and crosspieces are embedded in rubber to form a "one-piece" belt for use on highly mobile, cannon-carrying "tank destroyers" and other army vehicles requiring low rolling resistance, freedom from noise and vibration, higher speeds and traction, and greater all-around efficiency. These "racing shoes" for tank chasers are an outgrowth of work originally undertaken by Goodrich in developing this type of band track for farm and special industrial uses. These tracks use about 200 pounds less rubber per vehicle than tires would require.

Goodyear News

The Goodyear Tire & Rubber Co., Akron, has announced that its subsidiary, Goodyear Aircraft Corp., is erecting a new airship assembly plant in the Southwest.

Goodyear will soon go into production of lining for submarine battery-room walls. The lining is usually installed in two ⅛-inch layers over each battery room wall and floor to protect the steel walls from corrosion by escaping battery fluid and fumes as a submarine lurches, lists or dives at sharp angles. The lining has the approval of the United States Navy.

Another Goodyear development is "Resoweld," a synthetic resin, recommended for lining tanks, pipe, fittings, pumps, and similar equipment in place of rubber.

Goodyear will soon start assembling at its Akron and Gadsden, Ala., plants gas masks for civilians. These masks, lighter than the ones for soldiers, will use reclaimed rubber, and the carriers for them will be rubberless.

Fred W. Climer, director of personnel at Goodyear, last month joined the WPB in Washington, D. C., where he is in charge of the staff assigned to joint labor-management committee production drives throughout the United States. His duties at Goodyear have been assumed by R. S. Pope, director of personnel at Goodyear Aircraft Corp.

J. A. Boettner, chief pilot of Goodyear's airship organization, has been called to active duty in the Navy, with the rank of lieutenant commander.

F. A. Seiberling, dean of the rubber industry and chairman of the board of Seiberling Rubber Co., Akron, on October 6 celebrated his 83rd birthday at work.

The General Tire & Rubber Co., Akron, according to L. A. McQueen, vice president in charge of sales, has taken on Robert D. Spencer as manager of aeronautical sales and engineering. Mr. Spencer, an aeronautical engineer with several years' experience with several leading airplane companies, will direct all General's aviation tire design and engineering and contact the nation's aviation manufacturers.

EASTERN AND SOUTHERN

Smith U. S. Rubber President

Herbert E. Smith was elected president of United States Rubber Co., 1230 Sixth Ave., New York, N. Y., to succeed F. B. Davis, Jr., who is, however, chairman of the board and chief executive officer of the company. In addition Mr. Smith has been elected chairman of the executive committee and a member of the finance committee. Harry E. Humphreys, Jr., was elected vice chairman of the executive committee to succeed Mr. Smith and will serve, besides, as chairman of the finance committee and as a director. Bernard W. Doyle and Lammot du P. Copeland, directors, were also elected to the finance committee.

Mr. Smith was born in San Jose, Calif., in 1889 and graduated in 1911 from the University of California. Two years later he went to work with U. S. Rubber as mechanical rubber goods salesman in San Francisco and in 1918 came to New York as assistant western sales manager, becoming manager of the New York branch the same year. Mr. Smith became second vice president in 1926, was made a vice president, director, and member of the company's executive committee in 1929, and last January was elected vice chairman of the executive committee.

Mr. Davis revealed last month that Vice President L. D. Tompkins had resigned from the executive committee of the company following an assignment from the government to work for the Rubber Administration in Washington. In consequence Mr. Tompkins' duties with U. S. Rubber will be limited to advisory service to general managers of the company's divisions which operate government-owned ammunition plants. Mr. Tompkins has devoted a large part of his efforts to these plants in the last year. He has been with the company since 1916.

Hydron Lining for Forms for Pouring Concrete

W. A. Gibbons, director of development of U. S. Rubber Co., has introduced Hydron, which greatly increases concrete's resistivity to weather and abrasion in dams, fortifications, and construction projects of all types. The new discovery is an absorptive material faced with fabric and used as lining for forms in which concrete is poured. By removing water and air bubbles from the surface of concrete, Hydron produces a concrete that is in itself longer lasting and smoother in finish without brushing or scraping.

Dr. Gibbons revealed that in one test samples of concrete were held within two inches of an air blast delivering sharp steel grit at 20 pounds' air pressure. With concrete cast against ordinary wood forms the blast dug a hole ¼-inch deep in one minute. With concrete cast against Hydron, however, the particles bounced off the case-hardened surface, leaving a barely perceptible mark. In weathering tests samples of concrete cast against Hydron withstood four times as many cycles as samples cast against wood.

Pach Bros.

Herbert E. Smith

Goodyear-Chrysler Rubber Show

A full-scale replica of a section of a Malayan rubber plantation, a 100-foot educational display devoted to world rubber supply and production, together with many war and civilian defense products requiring rubber in one form or another are included in a special wartime exhibit which opened to the public October 8 in the Chrysler International Salon at Lexington Ave. and 42nd St., New York, N. Y.

The scientific rubber exhibit was prepared by the Goodyear Tire & Rubber Co., Akron, O. The rubber plantation shows how rubber trees are tapped and how the crude rubber is smoked and dried. The educational display, which graphically presents the story of rubber supply and production, is divided into seven sections; showing the world supply of natural rubber; the story of synthetic rubber, the history of its development, and the chemical and plant processes used in its production; reclaimed rubber; war tires; and recapping or retreading operations; "Thiokol"; and tire life extension. The remainder of the exhibit consists of an array of some actual war and civilian defense products made either by Chrysler or Goodyear.

Thermoid Co., Trenton, N. J., and domestic subsidiaries report gross September sales at $977,819, contrasted with $951,362 in August and $932,485 in September, 1941.

The Advance Solvents & Chemical Corp., with offices at 245 Fifth Ave., New York, N. Y., has purchased the seven-story factory building at 315 Coles St., Jersey City, N. J., which is now being remodeled and equipped to manufacture a number of the company's special products, quite a few of which are designed for use in natural and synthetic rubber compounds. The building has a floor area of 50,000 feet and is expected to be ready for operations about December 1.

Footwear Exhibit

The spring opening of the Volume Shoe Manufacturers was held at the Hotel New Yorker, New York, N. Y., October 18-21, with 225 exhibits. Elliot E. Simpson, representing the L. Drexsage Co., New York; T. A. Maguire & Co., New York; Baldwin Rubber Co., Pontiac, Mich.; American Rubber Products Corp., La Porte, Ind.; Atlantic Tubing & Rubber Co., Providence, R. I.; Mitchell & Smith, Inc., Detroit, Mich., and others, introduced the newly perfected non-rubber, non-leather soles for duration footwear. According to Mr. Simpson, the soles, made of cotton, lace, silk, plastic, or wood, are priority-free. They permit the use of two-tones in shoes, banned for shoes with leather or rubber soles. Models displayed the finished products.

Other exhibitors included the Accurate Shoe Corp., New York; Air-Kushin Shoes, Cincinnati, O.; Bata Shoe Co., Belcamp, Md.; and Cambridge Rubber Co., Cambridge, Mass.

Peter P. Pinto, general manager and treasurer of *The Rubber Age*, 250 W. 57th St., New York, N. Y., celebrated last month the twenty-fifth anniversary of his association with that publication, an occasion properly recognized by his associates. Mr. Pinto, "Pete" to his many friends in the rubber industry, joined *Rubber Age* in 1917, prior to which time he was connected with INDIA RUBBER WORLD for a short period. While with his present paper he took leave of absence to serve with the Bureau of Standards in Washington and later in France as an officer in the Radio Division of the Army Aviation Service. As General Manager of *Rubber Age*, Mr. Pinto has succeeded in building up the paper to a high degree, and the staff of INDIA RUBBER WORLD extends its congratulations on his long service and best wishes for his continued success.

Flintkote Co., 30 Rockefeller Plaza, New York, N. Y., has announced the resignation of Jack Miscall as manager of the rubber section, industrial products division; Dr. Miscall is now director of the laboratory division of the Essex Rubber Co., Trenton, N. J. D. C. Cochrane has been placed in charge of sales activities of Flintkote's rubber section; while E. O. Groskopk will be in charge of the technical work at the Morristown, N. J., plant, where the commercial production of rubber dispersions is conducted.

Toy Manufacturers of U. S. A., Inc., 200 Fifth Ave., New York, N. Y., in a recent survey of the Christmas toy market reveals that, owing to the war need of rubber and other strategic materials, toys available for this Yuletide will be reduced about 25% in volume with a sharp drop in variety.

Daily News, 220 E. 42nd St., New York, N. Y., is sponsoring a large experimental planting of *cryptostegia grandiflora* near Brownsville, Tex., as a quick domestic source of natural rubber to supplement the nation's synthetic program.

William M. Morse, editor emeritus of INDIA RUBBER WORLD, is wintering down South and can be reached at 460 Highland Ave, Dunedin, Fla.

The Rubber Corp. of America, 100 E. 42nd St., New York, N. Y., has announced that a substantial interest in the company has been sold to the Revertex Corp. of America, 37-08 Northern Blvd., Long Island City, N. Y. Close technical cooperation between the two concerns, especially in the field of synthetics, will result in the widened production of war materials as well as in the development of products for civilian consumption, using substitute materials for rubber. The following, who are the principal officers, are also the directors of the Rubber Corp.: Waldemar Kops, president; Solomon Z. Melup and Willian A. Merton, vice presidents and Alfred Merton, treasurer. The company has its plant at 274 Ten Eyck St., Brooklyn, N. Y. A subsidiary, **Climax** Rubber Co., Inc., sells products manufactured for civilian consumption.

De Laval Steam Turbine Co., Trenton, N. J., has elected as president H. L. Watson, since 1934 executive vice president and director, to succeed Francis J. Arend, who died August 24, 1942.

McCreary Tire & Rubber Co., Indiana, Pa., has announced that Elmore J. Baruth, for several years manager of the Depew Container Corp., Depew, N. Y., has joined its organization as technical director.

CANADA

War Time Board Order A-106, September 22, decrees that storage batteries are to be manufactured in one grade only and must conform in sizes and capacities to a prescribed schedule. Batteries made for rental must be marked with the word "Rentals." Symbols showing the month and year of shipment must be stamped on all batteries.

The Department of Munitions and Supply, Ottawa, Ont., has announced that in a further effort to conserve rubber, gasoline, and labor, effective November 15, passenger trips on Canadian bus lines will be restricted to within a 50-mile radius of the starting point, except on routes approved by the Transit Controller.

A Customs memorandum, October 3, indicates that the exportation from Canada of goods valued at $5 or less will not require an export permit, except shipments of rubber and rubber products, tea, sugar, and glucose.

H. V. Morden, for the past 12 years representative in Ontario for the Seiberling Rubber Co. of Canada, Ltd., Toronto, Ont., has been appointed Ontario representative for Laurentian Agencies Reg'd. Montreal, P. Q.

Synthetic Rubber Program

R. C. Berkinshaw, on loan to the Canadian Government from his peacetime job as general manager and treasurer of the Goodyear Tire & Rubber Co. of Canada, Ltd., New Toronto, Ont., has resigned as chairman of the Wartime Industries Control Board, Ottawa, Ont., to become president, treasurer, and chief executive of the Polymer Corp., Ltd., Toronto, Ont., the crown corporation responsible for Canada's synthetic rubber program. Arthur Bishop, formerly president of Polymer Corp., has been appointed chairman of the board. Comptroller H. R. Smyth has been named assistant treasurer, while J. R. Nicholson continues as general manager and secretary.

Mr. Berkinshaw's assignment is to complete and get into production by next midsummer what is said to be the largest single construction project ever undertaken at one place in Canada. The enlarged synthetic program for Canada contemplates an expenditure of around $60,000,000. When completed it is expected to turn out more than 40,000 tons of buna and Butyl rubber a year. There are more than 5,000 men needed in the construction job alone.

The National Research Council and the Dominion Department of Agriculture, Ottawa, Ont., are experimenting with more than 100 varieties of weeds growing along the roadsides in the dry interior of the Province of British Columbia in the hope of finding new sources of rubber. Experiments have been conducted with a number of these plants at the University of British Columbia, and samples have been forwarded to Ottawa. According to the university's research men, the most promising of these plants is the wild lettuce, which attains a height of from eight to ten feet, and when the leaf is broken and the sap rolled between two fingers, a small ball of rubberlike material results. University officials state they are waiting results of tests at Ottawa to determine the exact potentialities of the plant as a commercial source of rubber.

John C. Ross, formerly regional tire rationing officer, has been appointed supervisor of rationing in the Province of Manitoba region.

W. F. Kaplan has resigned as Toronto, Ont., branch manager, Panther Rubber Co., Ltd., Sherbrooke, P. Q., and returned to the United States, making his headquarters in Chicago, Ill. Mr. Kaplan was one of the group who came to Canada nearly 20 years ago to put on the original Panther campaign.

R. S. Jane, Shawinigan Chemicals Ltd., Montreal, P. Q., is scheduled to address one of the December luncheon meetings of the Electrical Club of Montreal on "Synthetic Rubber."

P. Horace Boivin, president, Granby Elastic Web Co. of Canada, Ltd., Granby, P. Q., and mayor of the city since 1933, officiated at a two-day celebration of the official opening of Granby's new city hall.

McGill University, Montreal, P. Q., has announced for the fifth year an evening extension course of 16 weekly lectures beginning in mid-October on the chemistry and technology of resins and elastomers. The course will cover theoretical chemistry and practical technology of synthetic plastics, coating resins, textiles, and rubbers. The course was planned especially for industrial chemists, fabricators, and sales promotion men. The instructor will be R. V. V. Nicholls, assistant professor of chemistry, McGill University, and secretary of the Rubber and Plastics Division, Society of Chemical Industry. Inquiries should be addressed to Dr. Nicholls.

The Northwest Line Elevator Association is urging the Canadian Government to use its surplus wheat crop for the manufacture of higher forms of alcohol for conversion into synthetic rubber and also for conversion into explosives, chemicals, and high-test motor fuels, similar to a project being developed in Australia.

John A. Riedell, sales manager, Weldon Roberts Rubber Co., Newark, N. J., U. S. A., was a recent visitor to Canada.

OBITUARY

Emil O. Malmquist

EMIL O. MALMQUIST, 38, member of the development department of the Goodyear Tire & Rubber Co., Akron, O., recently appointed to serve with the Rubber Conservation Committee, Army-Navy Munitions Board, died at the Sibley Memorial Hospital, Washington, D. C., September 27, following an appendicitis attack. Mr. Malmquist had worked with Goodyear since 1928; he was connected with the Akron, Los Angeles, and Swedish factories and only recently had returned from a special mission to Libya.

The deceased was born in New York, N. Y. He studied at Stevens Institute and received his engineering degree from the Massachusetts Institute of Technology.

He leaves a wife and two sons.

Clinton Earl Hooven

CLINTON EARL HOOVEN, 72, vice president of the Dayton Rubber Mfg. Co., Dayton, O., president of the Hooven Automatic Typewriter Co., Hamilton, O., and vice president of the General Machine Co., Hamilton, died suddenly in New York, N. Y., on September 26. Mr. Hooven, with John A. MacMillan, present chairman of the board, founded the Dayton company in 1908 and served also as secretary and a director.

Funeral services were held for him at the Hooven residence in Hamilton, September 29.

Mr. Hooven is survived by his wife, a daughter, two brothers, a sister, and several grandchildren.

Carl Nelson Hand

CARL NELSON HAND, 50, chemical engineer and retired plant manager of the Rubber Service department of Monsanto Chemical Co., St. Louis, Mo., died September 18 at Charleston, W. Va. It was Mr. Hand, with E. J. Smail, Jr., and C. O. North, who founded the Rubber Service Laboratories at Akron, O. in 1922. Prior to that, Mr. Hand had been with the Goodyear Tire & Rubber Co. Until 1929, when Rubber Service merged with Monsanto, he served as president and general manager. Since his retirement in 1938 as manager of the Rubber Service department plant at Nitro, W. Va., he had been engaged in private research.

A graduate of Hobart College, Mr. Hand held a chemical engineering degree from Massachusetts Institute of Technology. He was a Mason, and a member of the American Chemical Society and the Lions Club.

He is survived by his wife.

Edward L. Duffee

EDWARD LLEWELLYN DUFFEE, Columbus, O., district manager of the Lee Tire & Rubber Co., Conshohocken, Pa., died in Columbus, October 14, of coronary occlusion. He had joined Lee Tire in 1915 and was manager of the Indianapolis branch (1917-19), then Chicago manager (1919-21), later in charge of the solid tire division and sundries (1922-28), and finally became Midwest division manager (1928-1942). Previously, Mr. Duffee had been with the Hartford Rubber Co. from 1903 until its consolidation with United States Rubber Co., Pittsburgh, Pa.; branch manager of Fisk Rubber Co., Chicopee Falls, Mass., from 1911-1913; and one of the founders of Lancaster Rubber Co., Lancaster, O., in 1913.

The deceased was born in Fall River, Mass., March 5, 1882. He attended Durfee High School and Trinity College (Class of 1905). He was a member of the Big Brothers Association, Phi Gamma Delta, the University Club, and the Lions Club of Columbus.

Services were held at Columbus, October 16, and burial took place at Fall River, October 19.

Mr. Duffee leaves a wife and a son.

L. A. Has 80th Meeting

(*Continued from page* 175)

outing held at the Uplifters Club. Phil Drew, Goodyear Tire & Rubber Co., and George Steinbach, H. M. Royal, Inc., were named editor and business manager, respectively, of the 1943 yearbook. The nominating and election committees will be announced at the November meeting, and elections will take place at the annual meeting December 1.

H. F. Parkerton, Farrel-Birmingham Co., showed the movie "Robots and Rubber," followed by a short talk on the "Green Hell Country" given by Robert G. Chalfant, who described his trip through South America where he made a study of the South American Indians.

Three door prizes of war stamps were won by: W. V. Brady, U. S. Rubber Co., $10 book of defense stamps, D Carum, Carum Mfg. Co., $5 book; and C. Vonder Reith, Sierra Rubber Co., $3.50 in war stamps. Two raffle prizes, a $25 bond donated by E. A. Richards, of Oliver Tire & Rubber Co., and a badminton set, went to George Pieretti, Pieretti Machine Co., and O. B. Dutton, Arrowhead Rubber Co., respectively. Table favors consisting of a deck of cards were donated by E. L. Royal, H. M. Royal, Inc.

Chicago Group Winter Plans

THE Chicago Group, Rubber Division, A. C. S., held its first meeting of the 1942-43 season October 16th, at the Bismark Hotel, Chicago, Ill. The speaker, I. Drogin, director of research, United Carbon Co., Charlestown, W. Va., presented a very instructive paper on "A Study of Carbon Black in Natural and Synthetic Rubbers." The meeting was attended by 140 members and their guests.

The next meeting of the Group will be held in conjunction with the National Chemical Exposition, November 27, at the Sherman Hotel. At this meeting J. W. Crosby, of Thiokol Corp., will discuss "Outstanding Properties of Various Types of Thiokol." Also of special interest to rubber technologists will be several motion pictures, among which will be two new films presented by the Standard Oil Co. of New Jersey—"Rubber Goes Synthetic" and "Bouncing Molecules."

J. Sheridan, of New Jersey Zinc, who is chairman of the Christmas Party Committee, has announced that the party will be held December 18 in the Terrace Casino of the Morrison Hotel.

Buffalo Group Meeting

THE Buffalo Group, Rubber Division, A. C. S., met October 23 at the Hotel Lennox, Buffalo, N. Y., to hear Francis F. Lucas, Bell Telephone Laboratories, New York, N. Y., discuss "A Motion Picture Study of the Balata and *Hevea* Latices with Some Observations on Buna S and Neoprene Latices," which proved to be an elaboration of the paper Dr. Lucas presented at the recent fall meeting of the Division of Rubber Chemistry. Forty-four members and guests heard the talk.

The Group plans a meeting in December, but arrangements have not yet been completed.

Detroit Group Hears Talk on Rubber Substitutions

THE Detroit Rubber & Plastics Group, Inc., meeting on October 2 at the Hotel Detroit Leland, Detroit, Mich., was featured by a talk by C. J. Cleary, of Materiel Center, Army Air Forces, Wright Field, on "Rubber-Like Plastics and Rubber Substitutions." About 200 members and guests were present.

Mr. Cleary reported on the progress that had been made in using the various synthetics in aircraft construction to replace natural rubber. Problems encountered in making this change from natural rubber to synthetic rubber for specific items such as de-icer equipment and rubber hose were explained and discussed. The effect of various solvents on synthetic rubber compounds was also considered from the viewpoint of the use to which such compounds would be put in constructing aircraft.

A report on the Group's educational project in equipping a laboratory for work on the technology of rubber and plastics at Wayne University was made by Dr. C. W. Sellheimer, of the university.

Montreal Section Meeting

THE first meeting of the Montreal Section, Rubber and Plastics Division, S. C. I., for the 1942-43 season was held October 9 at the McGill Faculty Club, Montreal, P. Q., Canada. Attendance at the dinner and meeting reached record proportions. The Standard Oil Kodachrome sound picture, "Bouncing Molecules", provided the basis for a lively question and discussion period after the meeting. The next division meeting is scheduled for November 13 at the Faculty Club, when A. E. Byrne, Canadian General Electric Co., will discuss "Plastics."

R. I. Rubber Club to Elect

THE Rhode Island Rubber Club will hold a dinner-meeting, December 4, at the Narragansett Hotel, Providence, R. I., when election of officers and executive board will take place. The Club hopes also to have a speaker on synthetic rubber or resins.

Another Micronex Black

HI-TEAR MICRONEX is a recent addition to the Micronex series of colloidal carbons manufactured by Binney & Smith Co., 41 E. 42nd St., New York, N. Y. With a particle size the same as Standard Micronex, the new carbon black has a pH of 7.0 and a surface that is claimed to wet better and hence improve dispersion. The acid condition of most channel carbon blacks affects accelerators and activators in rubber compounding, but the higher pH of Hi-Tear Micronex reduces such cure retardation. This is of special interest to the electrical cable industry as the faster rate of cure is important in a continuous vulcanization process where a slow set-up might result in undercure. Considering Standard Micronex as 100%, Hi-Tear Micronex shows by comparison a tensile strength of 102%; plasticity, 108%; extrusion index, 106%; aging properties, 101%; tear, 110%; flex resistance, 110%. These advantages are also applicable to the footwear industry where excessive dosages of accelerator are not necessary because of the faster set up, thereby minimizing accelerator bloom, and where improved tear and flex resistance mean longer life.

ADDITIONAL RUBBER ORDERS

Amendment 14 to Supplementary Order M-15-b-1[1]

Section 940.5 *Supplementary Order M-15-b-1*[2] is amended as follows:

1. By striking from paragraph (b) thereof the following:

* * * or other purchase orders placed by or for the account of any other department or agency of the government of the United States. * * *

2. By changing paragraphs (b) (7), (b) (9) and (b) (10) to read as follows:

(7) Compounds for the manufacture of tires, tire casings, camelback, capping stock and tire and tube repair materials ..... List 7
(9) Tires and tire casings (except airplane and bicycle tires)..... List 9
(10) Tire tubes for passenger automobile, truck and agricultural implement tires ..... List 10

3. By inserting immediately after paragraph (b) (17) thereof the following new paragraph designated (b) (18):

(18) Camelback and capping stock..... List 18

4. By substituting the attached revised Lists 7, 9 and 10 for Lists 7, 9 and 10 now attached to such order.

5. By attaching thereto the following additional List designated List 18.

This order and the lists attached hereto shall become effective on August 24, 1942. (P.D. Reg. 1., as amended, 6 F.R. 6680; W.P.B. Reg. 1, 7 F.R. 561; E.O. 9024, 7 F.R. 329; E.O. 9040, 7 F.R. 527; E.O. 9125, 7 F.R. 2719; sec. 2 (a), Pub. Law 671, 76th Cong., as amended by Pub. Laws 89 and 507, 77th Cong.)

Issued this 24th day of August, 1942.

AMORY HOUGHTON
Director General for Operations

LIST 7

[Revised effective August 24, 1942]

Specifications for the manufacture of compounds for the manufacture of tires, tire casings, camelback, capping stock and tire and tube repair materials.

This revised List 7 sets forth the specifications to be used in the manufacture of tires, tire casings, camelback, capping stock and tire and tube repair materials, and is intended to furnish standards for the grades of compounds listed. Other Lists now attached and to be hereafter attached to Supplementary Order M-15-b-1 will govern the use of these compounds in the manufacture of finished products. These compounds need be used only when required by other specifications contained in lists now or hereafter attached to Supplementary Order M-15-b-1. The variations permitted by subdivision (b) of this revised List 7 are allowed in the manufacture of finished products covered by other applicable Lists unless prohibited by such other lists.

(a) *Compounds*

Description of Product		Maximum % by Volume	
Type	Grade	Crude Rubber	Whole Tire Reclaimed Rubber
(1) Tread, capping stock and camelback compounds.....	A	73.0	0.0
	B	59.5	17.5
	C	47.9	31.4
	D	40.4	41.3
	E	26.0	57.0
	F	0.0	89.3
(2) Friction compounds.	A	88.5	1.0
	B	78.0	15.0
	C+	69.0	25.0
	C	60.0	35.0
	D	43.0	50.0
	E	19.0	73.0
	FF	6.4	85.0
	F	0.0	90.0

(b) *Variations*

(1) Variations from the above specifications are permitted as follows:

	Tread, Capping Stock and Camelback Compounds	Friction Compounds
Crude rubber.....	Plus 0, minus 2.	Plus 0, minus 5.
Whole tire reclaimed rubber.....	Plus 2, minus (not limited).	Plus 5, minus (not limited).

(2) Any person may, with the prior approval of the Director General for Operations, reduce the percentages of crude rubber specified in these compounds, provided the tires manufactured therefrom bear the name of the manufacturer and, where produced to fill war orders, meet the specifications of the purchasers.

(3) With the types of formulas specified above, and with mold and gages selected, a manufacturer can calculate the maximum amounts of crude rubber and whole tire reclaimed rubber which may be used in the manufacture of a tire or tire casing of any specified type and size. Within the maximum amounts of crude rubber and whole tire reclaimed rubber thus calculated, a manufacturer may, in his discretion, shift the amounts between friction and tread, but may not use in the manufacture of any tire or tire casing more crude rubber or more whole tire reclaimed rubber than would be used in the manufacture of such tire or tire casing if the above specifications for tread and friction were followed, after allowing for tolerance permitted.

(4) All compounded rubber in a tire, other than the tread and sidewalls, is considered as "friction", and the tread and sidewalls are considered "tread". Each tire manufacturer shall adopt minimum gages or thicknesses in the following parts of all tires:

Sidewalls (but within the above specifications).
Plys and squeegees.
Under-tread (but within the above specifications).
Cushions and breakers.

"Minimum" as used in this paragraph (4) means the thinnest gage which the manufacturer believes can be used without materially detracting from the performance of the tire.

(5) Any manufacturer who can use subtreads, or who can apply sidewalls separate from the tread, and who can in either of these ways save crude rubber without detracting materially from the performance of the tire shall do so, even if it requires the use of slightly more reclaimed rubber. The total amount of crude rubber which a manufacturer may use if he uses subtreads or sidewalls to save crude rubber is the amount calculated in accordance with the appropriate friction and tread formulas, less the amount which may be saved through the use of subtreads and/or sidewalls.

LIST 9

[Revised effective August 24, 1942]

Specifications for the manufacture of tires and tire casings (except airplane and bicycle tires)

(a) *For other than war orders*

(1) Except as provided in paragraphs (a) (3) and (b) hereof, the manufacture of tires and tire casings (except airplane and bicycle tires) shall be confined to the sizes, plies and tread types listed below and such other sizes, plies and tread types as may be permitted by special authorization of the Director General for Operations.

The friction and the tread, respectively, of each of the sizes of tires and tire casings listed below shall be made from one of the grades of compounds listed in List 7 attached to Supplementary Order M-15-b-1, as such List may be revised from time to time, and appropriate grade of compound to be used for each respective friction and tread being that hereinbelow specified therefor opposite the description and designation of such size.

TRUCK, BUS AND SPECIAL PURPOSE TIRES

WPB Size No.	Size	Ply	Tread Type	Compounds to Be Used: Friction	Tread
1	9.00-13	6	Regular	C	B
2	7.00-15	6	Regular	C	C
3	6.00-16	6	Regular	C	C
4	6.50-16	6	Regular	C	C
5	7.00-16	6	Regular	C	C
6	7.50-16	6	Regular	B	B
7	7.50-16	8	Regular	B	B
8	10.50-16	10	Regular	A	B
9	10.50-16	12	Regular	A	B
10	10.50-16	12	Mud-Snow	A	B
11	6.00-17	6	Regular	C	C
12	7.00-17	8	Regular	C	C
13	7.50-17	8	Regular	B	B
14	7.50-18	8	Regular	B	B
15	8.25-18	10	Regular	A	B
16	9.00-18	10	Regular	A	B
17	10.00-18	12	Regular	A	B
18	11.00-18	12	Regular	A	B
19	6.00-20	6	Regular	C	C
20	6.50-20	6	Regular	C	C
21	6.50-20/32x6	8	Regular	C	C
22	6.50-20/32x6	8	Mud-Snow	C	C
23	7.00-20	8	Regular	C	C
24	7.00-20/32x6	10	Regular	A	B
25	7.00-20/32x6	10	Mud-Snow	A	B
26	7.50-20	8	Regular	B	B
27	7.50-20/34x7	10	Regular	A	B
28	7.50-20/34x7	10	Mud-Snow	A	B
29	8.25-20	10	Regular	A	B
30	8.25-20	10	Mud-Snow	A	B
31	9.00-20	10	Regular	A	B
32	9.00-20	10	Mud-Snow	A	B
33	9.00-20/36x8	12	Regular	A	B
34	10.00-20	12	Regular	A	B
35	10.00-20	12	Mud-Snow	A	B
36	11.00-20	12	Regular	A	B
37	11.00-20	12	Mud-Snow	A	B
38	12.00-20	14	Regular	A	B
39	13.00-20	16	Regular	A	B
40	9.00-22	10	Regular	A	B
41	10.00-22	12	Regular	A	B
42	11.00-22	12	Regular	A	B
43	7.00-24/36x6	10	Regular	A	B
44	7.50-24/38x7	10	Regular	A	B
45	9.00-24/40x8	12	Regular	A	B
46	10.00-24	12	Regular	A	B
47	11.00-24	12	Regular	A	B
48	12.00-24	14	Regular	A	B
49	13.00-24	16	Regular	A	B
101	8.25-20	10	Earthmover	B	A
102	9.00-20	10	Earthmover	B	A
103	10.00-20	12	Earthmover	B	A
104	11.00-20	12	Earthmover	B	A
105	12.00-20	12	Earthmover	B	A
106	13.00-20	14	Earthmover	B	A
107	14.00-20	16	Earthmover	B	A
108	16.00-20	16	Earthmover	B	A
109	18.00-24	16	Earthmover	B	A
110	18.00-24	20	Earthmover	B	A
111	21.00-24	16	Earthmover	A	A
112	21.00-24	20	Earthmover	A	A
113	24.00-32	24	Earthmover	A	A
114	24.00-32	36	Earthmover	A	A
115	36.00-40	34	Earthmover	A	A
116	8.25-20	12	Rock Service	A	A
117	9.00-20	12	Rock Service	A	A
118	10.00-20	14	Rock Service	A	A
119	11.00-20	14	Rock Service	A	A
120	11.00-24	14	Rock Service	A	A
121	12.00-24	16	Rock Service	A	A
122	13.00-24	16	Rock Service	A	A
123	14.00-24	20	Rock Service	A	A
124	16.00-24	20	Rock Service	A	A
125	18.00-24	20	Rock Service	A	A
126	21.00-24	20	Rock Service	A	A
127	18.00-24	16	Mud-Snow	A	A
128	18.00-24	20	Mud-Snow	A	A
129	18.00-40	20	Mud-Snow	A	A
130	21.00-24	16	Mud-Snow	A	A
131	21.00-24	20	Mud-Snow	A	A
132	21.00-28	20	Mud-Snow	A	A
133	24.00-32	24	Mud-Snow	A	A
134	24.00-32	36	Mud-Snow	A	A
135	30.00-40	34	Mud-Snow	A	A
151	7.00-20	10	(Flat base) rib	B	C
152	7.00-24	10	(Flat base) rib	B	C
153	7.50-24	10	(Flat base) rib	B	C
154	9.00-24	10	(Flat base) rib	B	C
155	9.00-24	10	(Flat base) traction	B	C
156	9.00-24	10	(Drop center) traction	B	C
157	10.00-24	8	(Drop center) traction	B	C
158	11.00-24	8	(Drop center) traction	B	C
159	12.00-24	8	(Drop center) traction	B	C
160	13.00-20	10	(Drop center) traction	B	C
161	13.00-24	8	(Drop center) traction	B	C
162	14.00-20	12	(Drop center) traction	B	C
176	7.50-15	10	Regular	A	B
177	8.25-15	12	Regular	A	B
178	9.00-15	12	Regular	A	B
179	10.00-15	14	Regular	A	B

PASSENGER AUTOMOBILE TIRES

201		6.50-15	4	C	B
202		7.00-15	4	C	B
203		7.00-15	6	C	B
204		7.50-15	6	C	B
205		5.50-16	4	C	B
206		6.00-16	4	C	B
207		6.00-16	6	C	B
208	6.25/6.50-16		4	C	B
209	6.25/6.50-16		6	C	B
210		7.00-16	4	C	B
211		7.00-16	6	C	B
212		7.50-16	6	C	B
213	5.25/5.50-17		4	D	C
214	6.00/6.50-17		4	D	C
215		7.00-17	6	C	B

[1] Part 940—Rubber and Balata and Products and Materials of which Rubber or Balata Is a Component.

[2] 7 F.R. 967, 2344, 2449, 2595, 2782, 3389, 4448, 5019, 5296, 5592, 5748, 5984, 6071, 6211, 6465.

WPB Size No.	Size	Ply	Tread Type	Compounds to Be Used: Friction	Tread
216	7.50-17	6		C	B
217	5.25/5.50-18	4		D	C
218	6.00-18	6		D	C
219	4.75/5.00-19	4		D	C
220	5.25/5.50-19	4		D	C
221	6.00/6.50-19	6		D	C
222	4.50/4.75/5.00-20	4		D	C
223	5.25/20	6		D	C
224	6.00/20	6		D	C
225	4.40/4.50-21	4		D	C
226	5.25-21	4		D	C
227	30 x 3½ Clin.	4		D	C

No limitation on tread designs.

MOTORCYCLE TIRES

251	26 x 2.25	2		C	B
252	3.25-19	4		C	B
253	3.30-18	2		C	B
254	3.50-18	2		C	B
255	3.85-18	4		C	B
256	4.00-18	4		C	A
257	4.50-18	4		C	A
258	4.00-19	4		C	A
259	4.50-19	4		C	A
260	5.00-16	4		C	A

No limitation on tread designs.

INDUSTRIAL TIRES

Description of Product	Compounds to Be Used: Friction	Tread
Industrial pneumatic tires:		
Single tube—all sizes	E[1]	F
Straight side—under 6.00 (except 4.00—8 regular and H. D.)	E	F
Straight side—6.00 and up	D	C
Exception 1—4.00-8 regular	FF	F
Exception 2—4.00-8 heavy duty	D	C
Industrial solid tires:		
Stretch-on or hollow center	....	F
Molded-on for hand operated vehicle	....	FF[2]
Molded-on for power driven or power drawn vehicles	....	A
Pressed-on	....	A
Metal base demountable	....	A

[1] Including tube.
[2] Friction grade.

(2) No person shall manufacture any size of tire in more than one regular tread design, unless such manufacturers' mold equipment for such size and tread design is insufficient for his requirements.

(3) Mileage tires for city and intercity buses may be manufactured from friction and tread compounds up to and including Grade A compound as set forth in said revised List 7, without restriction as to sizes, plies or tread design.

(4) Unless permitted by special authorization of the Director General for Operations, rayon shall not be used in the manufacture of any tires except mileage tires for city and intercity buses, and tires of WPB sizes numbers 35, 38, 42 and 53 in the number of plies specified for such sizes, and no person shall manufacture tires of WPB sizes numbers 35, 38, 42 and 53*, of both cotton and rayon construction.

(5) Each tire casing, manufactured under these specifications, except tire casings manufactured to fill war orders, shall be branded on the serial side near the serial number in letters at least ½ inch high, with the words "War Tire" and the letters specifying the respective grades of compounds used in the friction and the tread.

(b) To fill war orders

(1) The manufacture of tires and tire casings (other than airplane and bicycle tires) to fill war orders shall be confined to the sizes, plies, tread types and compounds specified in subdivision (a) hereof and the sizes, plies, tread types and compounds listed in subdivision (3) (2) hereof, except that other sizes, plies or tread types (but not other compounds) may be used when, but only when, there is delivered to the person manufacturing the tires a certificate signed by a contracting or inspecting official of the Army, Navy, Maritime Commission or other governmental agency listed in subparagraphs (a) (4) (i) (aa) or (a) (4) (ii) of Supplementary Order No. M-15-b, as amended, substantially as follows:

I hereby certify that the following tires covered by purchase order No. ..... are required for direct military (or naval) use, and that tires of sizes, plies and tread types enumerated in Revised List 9 attached to Supplementary Order No. M-15-b-1, as amended, are not adequate for such purpose.

Quantity Size Plies Tread Type
(Insert description of tires)

.....
Title.
For the (insert name of purchasing agency)

provided that this exception shall not apply to tractor or implement tire casings, which shall not be manufactured unless permitted by special authorization of the Director General for Operations.

(2) The friction and tread, respectively, of each of the sizes of treads and tire casings listed below shall be made from one of the grades and compounds listed in said List 7, the appropriate grade of compound to be used by each such respective friction or tread being that herein below specified therefor opposite the description or designation of such size.

TRUCK AND BUS TIRES

WPB Size No.	Size	Ply	Tread Type	Compounds to Be Used: Friction	Tread
300	6.00-16	6	Mud-Snow N. D.	C	B
301	7.50-16	6	Mud-Snow N. D.	B	B
302	9.00-16	8	Mud-Snow N. D.	B	B
303	5.50-18	6	Regular	C	C
304	7.00-20	8	Mud-Snow N. D.	C	C
305	7.50-20	8	Mud-Snow N. D.	B	B
306	8.25-20	10	Mud-Snow N. D.	A	B
307	9.00-20	10	Mud-Snow N. D.	A	B
308	11.00-20	12	Mud-Snow N. D.	A	B
309	12.00-20	14	Mud-Snow N. D.	A	B
310	14.00-20	16	Regular	A	B
311	14.00-20	16	Mud-Snow N. D.	A	B
312	10.00-22	12	Mud-Snow N. D.	A	B
313	11.00-24	12	Mud-Snow N. D.	A	B
314	14.00-24	16	Regular	A	B
315	14.00-24	16	Mud-Snow N. D.	A	B
317	14.00-24	24	Regular	A	B
318	6.50-10	6	Regular	C	C
319	8.25-15	14	Regular	A	B

(3) The friction and the tread, respectively, of other sizes, plies and tread types not specified in subdivision (a) (1) and (b) (2) hereof shall be made from one of the grades of compounds listed in said List 7, the appropriate grade of compound to be used for each respective friction or tread being that hereinbelow specified therefor opposite the description or designation of such class: *Provided*, That no tractor or implement tire casings shall be manufactured unless permitted by special authorization of the Director General for Operations.

Description of Product	Compounds to Be Used: Friction	Tread
13-24 inch rims, size 7.00 and smaller, 8 ply and less	C	C
13-24 inch rims, size 7.50, 8 ply and less	B	B
13-24 inch rims, size 8.25 and larger, 10 ply and more	A	B

(4) The skid depth of tires with mud-snow approved non-directional type treads shall be as follows:

Tire Size	Actual Mold Measurements in Inches
8.25-10	0.585
9.00-13	.62
15- and 16-inch rims:	
6.00	0.50
6.50	.52
7.00	.535
7.50	.56
8.25	.585
9.00	.62
10.00	.645
11.00	.67
20-, 22- and 24-inch rims:	
6.00	.50
6.50	.52
7.00	.535
7.50	.56
8.25	.585
9.00	.62
10.00	.645
11.00	.67
12.00	.70
13.00	.74
14.00	.80

Variations from the above measurements shall be permitted to the extent of 0.01-inch plus or minus throughout the mold.

(5) The outside diameter of tires with mud-snow approved non-directional type treads shall be as follows:

Tire Dimension: Diameter	Section	Outside Diameter in Inches—Inflated Tire: Minimum	Maximum
16-inch rims	6.00	28.60	28.80
	7.50	31.40	31.60
	9.00	35.00	35.30
	10.00	36.50	35.90

Tire Dimension: Diameter	Section	Outside Diameter in Inches—Inflated Tire: Minimum	Maximum
20-inch rims	7.00	35.60	35.90
	7.50	36.50	36.90
	8.25	38.10	38.40
	9.00	40.10	40.50
	10.00	41.00	41.50
	11.00	42.80	43.30
	12.00	44.20	44.70
	14.00	48.30	48.90
24-inch rims	14.00	52.30	52.90

(6) Standard tread radii of mud-snow approved non-directional type treads shall be between 80 and 95% of the line cross-section width of the Tire & Rim Association's standard tire sections.

(7) Run-flat combat tires to fill war orders may be manufactured in any sizes, plies and tread designs, and from any friction and tread compounds up to and including A grade compounds as listed in said List 7.

(8) Unless permitted by special authorization of the Director General for Operations, rayon shall not be used in the manufacture of any tires (including tires of the kinds and sizes referred to in subdivision (a) (4) of this revised List 9) to fill any war order, except run-flat combat tires.

(9) Where mud-snow tread is specified for a war order, the tire manufacturer shall use mud-snow N. D. molds in all cases in which he has mud-snow N. D. mold equipment of the proper size or sizes.

(e) Definition

Where used in this revised List 9: "regular" as applied to tread type means standard "100" level, on-the-road type.

LIST 10

[Revised effective August 24, 1942]

Specifications for the manufacture of passenger automobile, truck and agricultural implement tire tubes.

These specifications shall apply to all orders, including war orders.

No tire tube of any of the classes listed below shall be manufactured with a material volume in excess of the volume specified for such class as set forth below opposite the description or designation of such class.

Description of Product Type	Size	Maximum Material Volume (in Cubic Inches)
Passenger automobile tire tubes	5.50-16	51.2
	CD-16	57.8
	6.50-15	66.6
	7.00-15	72.2
	D-16	72
	7.50-15	89.4
	7.50-16	93.2
	A-20/21	42.8
	B-17/18	46.9
	C-17	56.1
	7.00-17	75.2
	7.50-17	93.4
Truck tire tubes 15- and 16-inch rims	6.00-16	65
	6.50-16	75
	7.00-15	85
	7.00-16	89
	7.50-15	103
	7.50-16	108
	9.00-16	191
	10.00-16	220
Truck tire tubes 20-inch rims or larger	6.00-20	75
	6.50-20	102
	7.00-20	135
	7.50-20	175
	8.25-20	197
	9.00-20	235
	10.00-20	300
	11.00-20	350
	12.00-20	450
	13.00-20	525
	14.00-20	670
Agricultural equipment tire tubes	4.00-12	25.3
	5.00-15	38.6
	6.00-9	36.8
	6.00-16	59.0
	DM-16	70.5
	6.50-32	137.8
	FM-24	153.5
	9.00-28	223.0
	HM-28	302.0
	KM-28	414.0
	5-40	92.5
	5.5-40	92.5
	6-40	118.0
	7-32	112.0
	8-32	157.0
	9-32	220.0
	10-28	242.0
	11-28	302.0
	12-30	385.5
	13-30	440.0
	14-30	498.0
	15-30	595.0

* We have been informed by the WPB that these sizes are incorrect and that they should be numbers 29, 31, 34, and 41. EDITOR.

Description of Product Type	Size	Maximum Material Volume (in Cubic Inches)
Lend-lease regular tire tubes	9.00-13	145
	10.50-16	250
	12.00-20	450
	13.50-20	670

Variations from the above maximum volumes shall be permitted to the extent of minus 3%.

Sizes not specifically set forth shall have maximum volumes proportionate to the sizes listed.

In the event that the maximum volume herein permitted for a tube of a given type and size manufactured by any person on the effective date of this order is less than the maximum indicated above, such person shall make no change in the maximum volume of such tube as then manufactured by him without the prior approval of the Director General for Operations.

The foregoing restrictions on material volume of tire tubes shall not apply to tire tubes for use with mileage bus or run flat or combat tires.

LIST 18

Specifications for the manufacture of camelback and capping stock.

(1) *Applicability of specifications.* The specifications set forth in this List 18 shall apply to all purchase orders, including war orders.

(2) *General restriction.* Unless permitted by special authorization of the Director General for Operations, no size or type of either camelback or capping stock shall be manufactured unless such size or type (of camelback or capping stock, as the case may be) is mentioned in this List 18.

(3) *Compounds.* All references in this List 18 to grades of compounds refer to grades of compounds listed in List 7 attached to Supplementary Order No. M-15-b-1, as such List may be revised from time to time.

(4) *Sizes.* Capping stock and camelback shall be manufactured only in gages of 10/32, 12/32, 14/32, 16/32, 18/32, 20/32, 22/32 inches and larger.

(5) *Passenger-type capping stock.* Passenger-type capping stock shall be manufactured only from compounds of Grade F, and may be faced with a compound of any of the gages listed below, provided that such compound of any such gage shall not contain more crude rubber by weight than the percentages set forth opposite such gage.

Gage:	Percentage of Crude Rubber
.012	54
.013	51
.014	48
.015	45
.016	42
.017	39
.018	36

(6) *Truck-type capping stock.* Truck-type capping stock shall be manufactured only from compounds of Grade C.

(7) *Truck-type camelback.* Truck-type camelback designed for retreading road building and road grading tires shall be manufactured only from compounds of Grade C.

(8) *Heavy-duty capping stock and heavy-duty camelback.* Heavy-duty capping stock and heavy-duty camelback designed for recapping and retreading mileage bus tires, or rock service tires of a cross-section of 8.25 inches or more may be manufactured from compounds of Grade A.

(9) *Airplane capping stock and camelback.* Capping stock and camelback designed for recapping and retreading airplane tires may be manufactured from compounds up to and including Grade A.

Amendment 15[1]

Section 940.5 *Supplementary Order M-15-b-1* is amended as follows:

1. By inserting immediately after paragraph (b) (18) thereof the following new paragraph designated (b) (19):

(19) Rubber covered rolls (except washing machine wringers, printer, fingerprint and business machines), List 19.

2. By attaching thereto the attached list designated List 19. (P.D. Reg. 1, as amended, 6 FR. 6680; W.P.B. Reg. 1, 7 F.R. 561; E.O. 9024, 7 F.R. 329; E.O. 9040, 7 F.R. 527; E.O. 9125, 7 F.R. 2719; sec. 2 (a), Pub. Law 671, 76th Cong., as amended by Pub. Laws 89 and 507, 77th Cong.)

Issued this 15th day of August, 1942.

AMORY HOUGHTON
Director General for Operations

LIST 19

Specifications for the manufacture of rubber covered rolls

(Except washing machine wringers, printer, fingerprint and business machines)

No person shall consume crude rubber, latex, reclaimed rubber, scrap rubber or synthetic rubber in the manufacture of rubber covered rolls enumerated below in subdivision (b) of this List 19 except in accordance with the specifications herein prescribed.

(a) *Compounds*

(1) RUBBER COMPOUNDS

Grade	Maximum % by Volume: Crude Rubber	Maximum % by Volume: Total RHC
M-C	85	85
M-D	80	80
M-E	75	75
M-F	70	70
M-G-1	65	65
M-H-2	60	80

(2) SYNTHETIC RUBBER COMPOUNDS

Grades: Butadiene	Chloroprene	Polysulphide	Total SRV
.....	.....	M-ST-2	85
M-SB-5	M-SN-5	.....	70

NOTE 1: The total rubber hydrocarbon (RHC) is the sum total of crude rubber and the average rubber value of reclaimed rubber expressed on a volume basis.

NOTE 2: The total synthetic rubber value (SRV) is the total synthetic rubber expressed on a volume basis.

Table A

Pusey & Jones Plastometer (hardness—1/8-inch ball):	Grade of Compound
Above 220	M-C, M-SB-5, M-SN-5 or M-ST-2.
180-220	M-D, M-SB-5, M-SN-5 or M-ST-2.
90-180	M-E, M-SB-5, M-SN-5 or M-ST-2.
60- 90	M-F, M-SB-5, M-SN-5 or M-ST-2.
0- 60	M-G-1, M-SB-5, M-SN-5 or M-ST-2.
Base rubber for rolls of all hardnesses	M-H-2.

(2) The cover thickness of each of the types of rolls listed in Table B below shall not exceed that specified for such type in Table B.

Table B

Industry	Type of Roll	Maximum Cover Thickness
Paper		
Group I	Press, smoothing, sizing, lump breaker, breast pad	3/4 inch on rolls up to and including 24 inch core diameter. 7/8 inch on rolls of larger core diameter.
	Waxing—all types	3/4 inch.
	baby, monkey and primary press	When used as top roll 3/4 inch; when used as bottom roll 1/2 inch.
Group II	Suction press	7/8 inch.
	Couch, including cylinder wet machine and extractor	1 1/4 inch.
	Couch, for deckers, thickeners, save-alls, and washers	1/2 inch.
	Felt, table, wire carrier, guide	1/4 inch.
	Worm felt	1/4 inch over-all.
	Draw cutters (wormed)	1/2 inch over-all.
	Coating	1 inch.

NOTE 1: Coverings for the classes of rolls described in Group II above may be applied only to cores already in use as a component part of the machine. No new cores for existing or new machines may be covered with rubber.

NOTE 2: Embossing rolls shall not be rubber covered.

NOTE 3: Where crude rubber or reclaimed rubber is mixed with synthetic compounds or where a mixture of synthetics is used, the RHC volume plus the SRV volume shall not exceed the maximum SRV by volume of the grade specified.

NOTE 4: Compounds of lower rubber and rubber hydrocarbon (RHC) content may be used in manufacturing rubber covered rolls listed in this List 19, provided the physical and service requirements, where specified, are met.

(b) *Rubber covered rolls*

(1) Roll covering compounds for each of the types of rolls listed in Table A below shall be made from the grade of compounds (as listed in subdivision (a) (1) and (a) (2) of this List 19) specified for such type in Table A.

[Textile industry for dyeing, bleaching and finishing industry]

Type of Roll	Maximum Cover Thickness, Inch
For flat goods service:	
Top rolls—all types	5/8
Bottom rolls	3/8
For rope form and warp yarn service:	
Top rolls—all types	3/4
Bottom	3/8
For other services, including jig, beam, immersion guide, and where protective covering against corrosive chemicals is required	1/4

NOTE: Wool scouring rolls may be made to existing dimensions.

Tanning Industry

Type of Roll	Maximum Cover Thickness, Inches
Splitting machines	1
Setting-out, buffing, fleshing, putting-out, unhairing	3/4
Wringer, shaving, breast and staking	1/2
Steel Mills	
Electrolytic and tinning	5/8
Scrubber	1 1/2
Carrier and support	1
Dancer and immersion	3/4
Acid	3/4
Pinch	1 1/2
Polishing	1 1/4
Bonderizing	3/4

NOTE: On all rolls where ends, shaft or shoulders are protected from corrosion with coverings, the thickness shall not exceed 1/4-inch. For all other industrial rolls (except those excluded in the caption of this List 19) a thickness of covering in excess of 3/4-inch maximum is prohibited.

Amendment 16[1]

Section 940.5 *Supplementary Order M-15-b-1* is amended as follows:

1. By changing paragraph (b) (3) thereof to read as follows:

(3) Rubberized fabrics for protective clothing (other than footwear and gloves) . . List 3

2. By substituting the attached revised List 3 for List 3 now attached to such order.

(P.D. Reg. 1, as amended, 6 F.R. 6680; W.P.B. Reg. 1, 7 F.R. 561; E.O. 9024, 7 F.R. 329; E.O. 9040, 7 F.R. 527; E.O. 9125, 7 F.R. 2719; sec. 2 (a), Pub. Laws 671, 76th Cong., as amended by Pub. Laws 89 and 507, 77th Cong.)

Issued this 1st day of September, 1942.

AMORY HOUGHTON
Director General for Operations

LIST 3

[Revised effective September 1, 1942]

Specifications for the manufacture of rubberized fabrics for protective clothing (other than footwear and gloves). (1) Except as provided in paragraph (8) hereof, no person shall use any rubber, latex, reclaimed or scrap rubber in the manufacture of rubberized fabrics for protective clothing, except footwear, gloves and industrial occupational protective clothing consisting of pants, coats, jackets, hats, aprons, firemen's and policemen's clothing, parkas, ponchos, and rain suits.

(2) Except as provided in paragraph (8) hereof, the specifications set forth in this revised List 3 shall apply to all purchase orders including war orders and orders placed by any department or agency of the United States Government.

(3) No crude rubber or latex shall be used in compounds for rubberizing the fabrics for these products.

(4) Single coated fabrics shall contain not more than 12 ounces of compounds per square yard.

(5) Double coated fabrics shall contain not more than 19 ounces of compounds per square yard.

(6) Double texture fabrics shall contain not more than 10 ounces of compounds per square yard.

(7) Crude rubber may be used in the manufacture of cements and/or tapes necessary for seaming in the manufacture of these products.

(8) The restrictions and specifications imposed by this revised List 3 shall not apply to:

(i) Rubber life saving suits designed for use by seamen.

[1] Title 32—National Defense, Chapter IX—War Production Board, Subchapter B—Director General for Operations. Part 940—Rubber and Balata and Products and Materials of Which Rubber or Balata Is a Component.

(ii) Aviation waders, self-inflating life preservers, dual tube belts and ponchos when required to fill war orders.

(iii) Commercial diving equipment.

(iv) Raincoats and parkas scheduled for delivery to or for the account of the United States Navy at any time prior to October 1, 1942, under the delivery schedules of purchase orders in existence on August 1, 1942.

Statement of INDIA RUBBER WORLD

Statement of the ownership, management, circulation, etc., required by the Acts of Congress of August 24, 1912, and March 3, 1933, of India Rubber World, published monthly at Philadelphia, Pennsylvania, for October 1, 1942.

State of New York } ss.
County of New York }

Before me, a notary public in and for the State and county aforesaid, personally appeared B. Brittain Wilson, who, having been duly sworn according to law, deposes and says that he is the Business Manager of India Rubber World and that the folowing is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, as amended by the Act of March 3, 1933, embodied in section 537, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are: Publisher, Bill Brothers Publishing Corp., 386 Fourth Ave., New York, N. Y.; editor, Robert G. Seaman, 386 Fourth Ave., New York, N. Y.; managing editor, S. R. Hague, 386 Fourth Ave., New York, N. Y.; business manager, B. B. Wilson, 386 Fourth Ave., New York, N. Y.

2. That the owner is: Bill Brothers Publishing Corp., Caroline L. Bill, Raymond Bill, Edward Lyman Bill, Randolph Brown, all at 386 Fourth Ave., New York, N. Y.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1% or more of total amount of bonds, mortgages, or other securities are: None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

B. Brittain Wilson,
Business Manager.

Sworn to and subscribed before me this 24th day of September, 1942.

[Seal]

Wm. A. Low,
Notary Public Queens Co. No. 1116, Reg. No. 7389. Certificate filed in N. Y. Co. No. 757, Reg. No. 3L460.

(Commission expires March 30, 1943)

Tire and Tube Quotas for November, 1942*

United States and Territories / Region	Passenger and Motorcycle, Etc.				Truck, Bus, Farm Tractor, Implement, Etc.		
	New Tires Class "A" Eligibles	New Tires Grade II Class "B" Eligibles War Workers Only	Recaps Classes "A" and "B" Eligibles	New Tubes Classes "A" and "B" Eligibles	New Tires Class "A" Eligibles	Recaps Classes "A" and "B" Eligibles	New Tubes Classes "A" and "B" Eligibles
No. 1 Maine	269	923	6,241	863	1,194	1,431	1,354
New Hampshire	175	530	3,920	533	561	808	706
Vermont	132	326	2,543	346	530	577	571
Massachusetts	1,708	3,750	30,572	4,149	3,502	3,517	3,622
Rhode Island	316	722	5,824	790	674	659	688
Connecticut	676	3,135	19,826	2,745	2,796	2,962	2,971
BOSTON SUB-TOTAL	3,276	9,386	68,926	9,426	9,257	9,954	9,912
No. 2 New York State	6,445	7,813	76,012	10,453	9,792	9,349	9,874
New Jersey	1,423	3,340	30,092	3,962	3,861	4,150	4,133
Pennsylvania	3,505	13,747	95,619	13,012	9,775	12,215	11,346
Delaware	135	410	2,893	398	455	594	541
Maryland	1,325	4,444	24,896	3,663	2,814	2,811	2,901
District of Columbia	1,746	825	8,233	1,338	597	606	621
NEW YORK SUB-TOTAL	14,579	30,579	237,745	32,826	27,294	29,725	29,416
No. 3 Ohio	2,883	9,435	71,304	9,594	9,292	9,552	9,724
Kentucky	871	3,281	20,917	2,922	2,682	4,370	3,639
West Virginia	573	2,372	15,289	2,118	2,059	3,296	2,763
Michigan	2,542	5,496	46,821	6,290	8,258	6,785	7,760
Indiana	1,654	6,203	41,577	5,729	5,784	6,261	6,214
CLEVELAND SUB-TOTAL	8,523	26,787	195,908	26,653	28,075	30,264	30,100
No. 4 Virginia	1,476	3,720	25,096	3,549	4,628	5,857	5,411
North Carolina	1,470	2,992	25,008	3,373	5,177	6,826	6,193
South Carolina	765	1,445	12,592	1,701	2,016	2,792	2,480
Georgia	1,239	2,499	21,319	2,880	4,024	5,823	5,084
Florida	1,321	2,085	19,787	2,660	4,056	5,163	4,754
Tennessee	1,182	2,627	20,001	2,762	3,868	4,778	4,460
Alabama	872	2,972	19,560	2,725	3,059	4,554	3,924
Mississippi	897	1,199	9,664	1,386	2,919	3,570	3,348
ATLANTA SUB-TOTAL	9,122	19,539	153,027	21,036	29,747	39,363	35,654
No. 5 Missouri	1,924	3,002	28,520	3,837	5,745	6,581	6,358
Kansas	815	1,819	17,423	2,269	4,170	4,421	4,432
Oklahoma	1,332	2,313	19,912	2,720	4,020	3,745	4,006
Arkansas	498	1,109	9,422	1,264	2,433	3,245	2,933
Texas	4,087	5,950	57,642	7,772	12,840	12,031	12,833
Louisiana	894	1,321	12,366	1,680	2,897	2,385	2,725
DALLAS SUB-TOTAL	9,550	15,514	145,285	19,542	32,105	32,408	33,287
No. 6 Illinois Excl. Met. Chicago	1,440	4,119	34,486	4,560	5,684	4,147	5,072
Met. Chicago	2,006	1,797	24,658	3,226	4,832	4,139	4,626
Iowa	1,026	1,702	20,192	2,565	3,699	2,814	3,360
Nebraska	567	813	9,948	1,270	3,192	2,707	3,039
North Dakota	217	267	3,250	422	836	473	675
South Dakota	229	396	4,111	536	1,217	1,122	1,207
Minnesota	1,066	1,281	15,261	1,995	3,292	2,592	3,036
Wisconsin	1,090	2,244	18,544	2,521	3,126	3,116	3,221
CHICAGO SUB-TOTAL	7,641	12,619	130,450	17,095	25,878	21,110	24,236
No. 7 Montana	285	464	4,036	553	1,206	1,370	1,329
Idaho	210	471	4,095	546	1,002	1,435	1,257
Wyoming	144	263	2,229	304	609	671	660
Colorado	654	1,324	11,291	1,525	2,360	2,197	2,352
Utah	329	810	6,153	843	1,301	1,475	1,429
New Mexico	275	385	4,017	534	1,121	1,032	1,110
DENVER SUB-TOTAL	1,897	3,717	31,821	4,305	7,599	8,180	8,137
No. 8 Washington	776	2,069	16,195	2,188	2,419	3,082	2,838
Oregon	762	1,953	14,375	1,980	3,265	3,668	3,577
Northern California	1,694	4,744	36,341	4,922	6,017	9,651	8,085
Southern California	2,920	6,656	51,676	6,903	4,754	6,306	5,704
Nevada	85	196	1,757	232	598	525	578
Arizona	245	597	5,316	700	1,916	2,285	2,165
SAN FRANCISCO SUB-TOTAL	5,582	16,215	125,660	16,925	18,969	25,517	22,947
No. 9 Puerto Rico	246	98	1,086	177	247	182	221
Virgin Islands	3	5	78	9	16	3	10
Canal Zone	8	1	220	24	32	2	18
Alaska	86	10	—	19	241	—	124
WASHINGTON D. C. SUB-TOTAL	343	114	1,384	229	536	187	373
TOTAL U. S. AND TERRITORIES EXCL. RESERVES	60,513	134,470	1,090,206	148,037	179,460	196,708	194,062

*The quotas listed do not include reserves.

Dividends Declared

Company	Stock	Rate	Payable	Stock of Record
Baldwin Rubber Co.	Com.	$0.12½	Oct. 21	Oct. 15
Collyer Insulated Wire Co.	Com.	0.30 irreg.	Oct. 1	Sept. 23
Crown Cork & Seal Co., Ltd.	Com.	0.50 q.	Nov. 16	Oct. 31
Dayton Rubber Mfg. Co.	Com.	0.25 q.	Oct. 26	Oct. 12
Dayton Rubber Mfg. Co.	Pfd. A	0.50 q.	Oct. 26	Oct. 12
DeVilbiss Co.	Com.	0.50	Oct. 15	Sept. 28
DeVilbiss Co.	7% Pfd.	0.17½ q.	Oct. 15	Sept. 28
Firestone Tire & Rubber Co.	Com.	0.25	Oct. 20	Oct. 5
General Cable Corp.	Pfd.	1.75 accum.	Nov. 2	Oct. 23
General Tire & Rubber Co.	Com.	0.50	Oct. 30	Oct. 20
L. H. Gilmer Co.	Com.	0.25	Oct. 15	Oct. 1
Hercules Powder Co.	6% Pfd.	1.50 q.	Nov. 14	Nov. 2
Lee Rubber & Tire Corp.	Capital	0.75	Oct. 26	Oct. 15
Lima Cord Sole & Heel Co.	Com.	0.10	Sept. 30	Sept. 18
Okonite Co.	Com.	1.50	Nov. 2	Oct. 22
Okonite Co.	Com.	0.50 extra	Nov. 2	Oct. 22
Plymouth Rubber Co., Inc.	B Stock	2.00	Oct. 15	Oct. 10
Plymouth Rubber Co., Inc.	7% Pfd.	1.75 q.	Oct. 15	
U. S. Rubber Reclaiming Co.	Pfd.	0.40 accum.	Nov. 2	Oct. 19
Tyer Rubber Co.	Pfd.	1.50 q.	Nov. 14	Nov. 2

Rubber Trade Inquiries

The inquiries below are of interest not only in showing the needs of the trade, but because additional information may be furnished by readers. The Editor is glad to have those interested communicate with him.

No.	Inquiry
2882	Suppliers of substitutes for rubber.
2883	Manufacturers of rubber bulbs for pipettes, medicine droppers, and pressure vacuum bulbs with both metal and hard rubber valves.
2884	Manufacturers of preparation or compound to conserve tire life.
2885	Manufacturers of rubber horseshoes.
2886	Sources of supply of small laboratory hydraulic presses.

IT CUTS ITS TEETH ON *Giant Ring Gears*

THEY are a very special kind of teeth you see being cut in this big ring-gear. In the first place the gear is more than 8 feet in diameter. Second, it must be so accurately cut that there is a maximum tolerance of only 3-thousandths—the thickness of a human hair—between the centers of any two teeth, even those many feet apart. Third, although we are not gear-cutters by profession, this big gear when finished will be a precision part in one of Uncle Sam's key war weapons, now in volume production.

When we took on this work we found there were few machines in the entire country capable of cutting teeth so accurately in gears so large, and all of them were fully occupied with other vital jobs. So—we built the machines we needed. Designed and built them from the ground up. They're at work now, turning out these big precision parts our nation needs, turning them out swiftly and to specifications.

Creative Engineering has been our special province, our major responsibility for many years. The Creative Engineering that today is concentrated upon the problems of war, will, when the war is won, turn again to the peaceful, but no less exacting, problems of specialized production machinery for the rubber industry and high-performance extruders for plastics.

NATIONAL RUBBER MACHINERY CO
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CREATIVE ENGINEERING

EUROPE

GERMANY

Vinidur

Of the various non-vulcanizable synthetic materials developed in Germany to replace rubber and metals, the most useful for anti-corrosion purposes are special types of Igelit and Oppanol B. The Igelits are vinylpolymerizates, and the type most suitable for anti-corrosion materials is the hard quality known as Vinidur, earlier marketed as Decelith, Mipolam, and Igelit PCU.

Vinidur has a specific gravity of 1.38. It has a comparatively low softening point (80° C.), is non-inflammable, odorless, tasteless; has a tensile strength of 600 kgs/cm², bending strength of 1000 kgs/cm², and impact bending strength of over 150 kgs/cm². Up to 40° C., Vinidur is resistant to water, saline solutions of all kinds, alkalis, hydrochloric acid at all concentrations, sulphuric acid up to 85%, nitric acid up to 55%, formic and acetic acid, mineral oil, benzene, alcohol, and carbon tetrachloride. It is not resistant to aromatic hydrocarbons (benzol, toluol, etc.), ether, esters, ketones, and the other chlorinated hydrocarbons.

Vinidur is supplied in the form of thin sheets 0.2 to 0.6 millimeters thick, 600 to 700 millimeters wide, in rolls; plates up to 40 millimeters thick and in various sizes; tubing from 3 to 150 millimeters in diameter; solid round rods from five to 60 millimeters in diameter; and hollow round rods, 18 to 60 millimeters in diameter and in lengths of two meters. The sheet can usually be employed within a temperature range of —10° C. to +60° C., and it can be cut, drilled, turned, sawed, and milled. But because of its low softening point care must be taken to avoid overheating; hence cooling with compressed air during the above operations is recommended. Sheets up to two millimeters thick can be cut with shears.

Anti-corrosion Vinidur sheet can be attached to metal, wood, concrete, and masonry. Metal surfaces are first thoroughly cleaned by sandblasting, then given three coats of a special cementing solution, P.C. 10; each coat is allowed to dry thoroughly before the next is applied, a process that takes about 12 hours. Then the metal vessel is carefully heated from the outside to about 130° C., and until the coating takes on a milky appearance. Vinidur sheet at least 0.7 millimeter thick must be used for linings; they are coated with a special cementing solution, P.C.A. 20, and dried, then carefully placed, so as not to enclose any air, on the preheated walls of the container. The edges are allowed to overlap 50 millimeters, and seams and laps receive a final cleaning with methylene chloride and the cementing solution, P.C. 20, before being stuck together.

Instead of cementing the edges together, the newer process of welding is frequently preferred. In the welding process developed for synthetics a stream of hot air or gas is directed on the places to be joined; the air is heated in a special heater until it almost reaches the flow temperature of the plastic (usually from 230 to 270° C.), and the burner is held five to ten millimeters away. The edges of the material gradually soften, when a welding wire is inserted into the burner and applied to the softened places. The finished seam may be smoothed down with the tip of the burner. For Vinidur, air is heated to 250° C., and the welding wire is also of Vinidur. Welding offers several advantages over cementing: it is less complicated; the drying period is eliminated; and there is no need of overlapping the edges. The process has proved especially valuable in the production and installation of large-diameter pipes of Vinidur as, before the method was developed, all Vinidur pipes and tubes were made on the tubing machines, and the width of the tubing obtainable was thus limited. But welding permits the use of sheets cut on special circular saws to a width corresponding exactly to the required circumference of the pipe. The parts are heated in the tunnel oven, bent to form pipes, and then welded together. The rough shapes are allowed to expand again in the heated chamber and finally given the proper shape with the aid of a divided core.

Large pipes made wholly of Vinidur have given good service where the mechanical demands were not too great; in other cases

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iron pipes have been lined with the Vinidur. Other uses for anti-corrosive Vinidur are in storage batteries, cooling coils, chemical apparatus.

Another form of Igelit, known as Astralon, has proved satisfactory in coverings for counters and basins in pump rooms of a well-known German spa. The pipes for dispensing the curative waters were made of Vinidur, replacing the copper pipes hitherto used.

Oppanols

Oppanol B is polyisobutylene and the German equivalent of Vistanex. According to last reports, the German material appears in various forms, of which the most useful appear to be Oppanol O, Oppanol ORG, and Oppanol OG. The first contains no fillers; ORG and OG are compounded, the latter with special fillers intended to make it useful as packing and jointing for pipes and containers. Oppanol OG is said to have chemical properties surpassing those of natural rubber.

Some of the physical properties of the three types are:

	Density	Upper Temperature Limit of Use °C.	Tensile Strength Kg/Cm²	Elongation	Heat Conductivity Kcal/Mh°C.
Oppanol					
O	1.0	80	over 20	600	0.036
ORG	1.4	110	over 20	300	0.152
OG	1.6	60 at 3 atm.	over 40	250	0.26

The lowest temperature at which Oppanol can be used is claimed to be under —50° C.; some authorities put it as low as —80° C.

The Oppanols, which more nearly approach rubber in regard to elasticity than any other plastic, have also a very high degree of extensibility. They are not affected by oxygen or air or even ozone, at temperatures up to 100° C., and are resistant to concentrated hydrochloric, hydrofluoric, sulphuric, and phosphoric acids, to glacial acetic acid, concentrated potash lye, concentrated ammonia, concentrated solution of chromic acid in water, 10% bichromate solution, concentrated permanganate of potash solution, 3% peroxide of hydrogen, aqueous calcium chloride, 10% hydrosulphide. Aliphatic and aromatic hydrocarbons, chlorinated hydrocarbons, and carbosulphide cause swelling, even dissolution.

Oppanol is not soluble in low mono- and polyvalent alcohols, esters, and ketones. Unlike natural rubber, Oppanol is not soluble in cyclohexanone; it swells slowly in various vegetable and animal oils; water does not affect it.

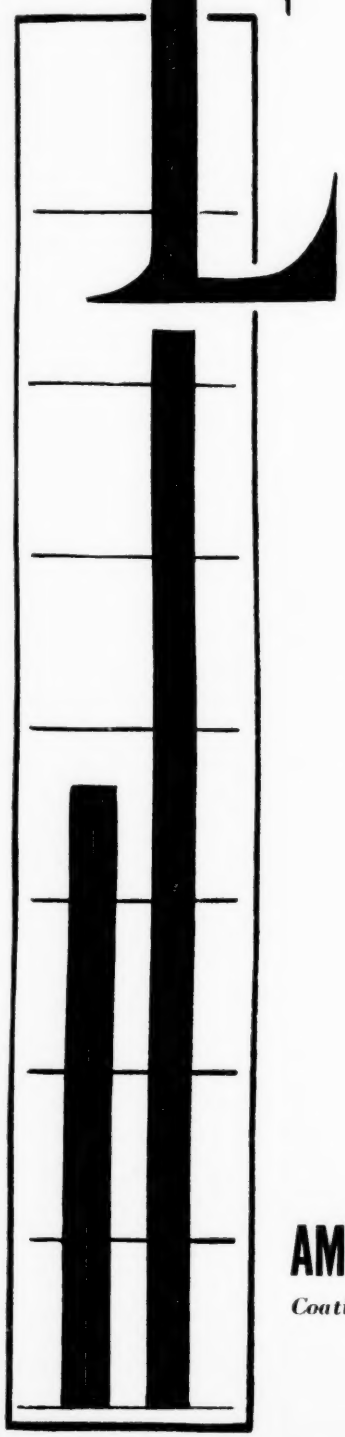
When Oppanol is milled at low temperature for some time, it undergoes degradation to a lower polymer. If the temperature of the rolls is raised again, however, plasticity increases, and molecular breakdown due to milling decreases until finally at 140° C. that degree of plasticity is reached where degradation no longer occurs. At still higher temperatures Oppanol shows marked stability, and milling for as long as half an hour at 200° effects no noticeable change in the degree of polymerization.

On the other hand pure Oppanol is sensitive to the action of strong light and, when exposed to direct sunlight, gradual decomposition, starting at the surface, sets in. Although Oppanol is more extensible and elastic than Vinidur and can be used over a wider range of temperature, it is inferior in regard to mechanical resistance, even when reenforced with suitable fillers. Hence while Vinidur alone can be used to replace metal structural parts where the mechanical strain is not excessive, Oppanols cannot be so employed and serve chiefly as anti-corrosion linings, joints, and packings, for which purposes, however, they are very suitable because of the high resistance to chemicals and water and good aging properties, and they can frequently be used where natural rubber fails.

Experience has shown that Oppanol is also useful as chemical and age resistant interlining. It has, furthermore, been found valuable for the production of acid resistant garments, aprons, hose, etc., but because of its deformability Oppanol is preferably used in conjunction with other materials in the manufacture of hose, giving outstanding service. In one case an Oppanol hose core with rubber cover showed excellent resistance when conveying concentrated alkali, dilute and concentrated sulphuric acid and even fuming sulphuric acid. Packing reenforced with suitable fiber or powdered fillers have given good results up to 100° C.

Oppanol linings for containers are attached in much the same

EXTEND



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Resin and Lacquer Emulsions have been finding an ever-widening use in many industries. They have proved invaluable in replacing other materials in adhesives, modifiers, binders and fillers, grease proofing, waterproofing, sizing, impregnating, coating, color dispersions and innumerable other uses.

In the Rubber Industry these emulsions are being used today as *Latex Modifiers* and *Complete Latex Replacements* to extend, thicken, stabilize, increase penetration, improve resistance to acids, oils and solvents; in *Coatings* to produce adherent pigmented or clear coatings on paper, fabric, and rubber and as intermediate coats for lacquer on rubberized cloth; in *Rubberizing* textiles; in *Latex Treated Papers* to increase strength and improve ageing; in *Adhesives*, for paper, for leather to cloth, and cloth to cloth.

These are just a few of the known applications in the rubber field. Undoubtedly in your own plant you will find many uses for these emulsions to improve your products and extend the supply of the vital materials, LATEX, RECLAIMS, and SYNTHETICS.

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A Few of Our Products of Interest to the Rubber Industry

VULPRENES A series of elastomers designed to replace or extend rubber for specific uses.

ALKYD 18 An alkyd type resin emulsion which is non-yellowing and non-oxidizing. Film is water-white and non-tacky. Preferred where slight oxidizing action may be considered harmful to rubber. Extender for latex in coating, combining and impregnating processes.

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way as Vinidur linings, with special cements known as St. III and St. IV. Sometimes Oppanol-bitumen mixes serve as adhesive for the lining; in those cases the edges of the Oppanol sheet are joined by a process similar to forge welding, and the cements are used as welding material. A wedge-shaped heater, heated to 200° C., is passed between the overlapping edges, previously coated with the cements, until sufficiently warmed; then the edges are pressed together and smoothed over with the heater.

Vinidur and Oppanol have certain valuable properties as acid resistant materials, not the least of which is the ease with which they can be applied. They can be used for several purposes where natural rubber cannot be employed. Compared with anti-corrosion metals, they have the advantage of far greater chemical resistance, but against this is their low mechanical resistance, especially that of Oppanol, and the comparatively limited temperature range of their usefulness.

Here mention may be made of the standard adopted by German investigators for measuring the chemical resistance of synthetics. To begin with, they have shown that while chemical, or rather electro-chemical processes are responsible for corrosion of metals, these processes play practically no part in the attack of chemicals on synthetics, except in the case of powerful oxidation agents like nitric acid and halogens. Chemical attack of synthetics is not revealed either by any coating or wearing away of the surface; the action takes place internally because the synthetics lack the closely knit structure and the powerful fields of force between the molecules present in the crystal lattice of the metals.

The chief form of attack on synthetics is a penetration of fluids and gases into the interior of the substance, causing a swelling and corresponding increase in volume which, particularly when due to water, results in a corresponding loss of strength and extensibility; the damage increases with the rise in temperature. The degree of permissible damage by non-dissolving agents has been determined for Vinidur and Oppanol; the measure is the effect on the latter materials of water at 40° C. These synthetics are therefore considered resistant when the damage caused by aqueous corrosive agents is below or close to that caused by water at 40° C. The extent of the damage depends on the degree of concentration of the attacking substance and decreases with rising concentration since the harm is chiefly caused by the water.

If the synthetic is also more or less soluble in the swelling agent, disruption due to the dissolving process accompanies swelling, and the effect may vary from barely noticeable to marked softening, or even complete destruction of the structure.

GREAT BRITAIN

Institution of the Rubber Industry

In recognition of eminent and distinguished service to an allied industry, the General Council of the Institution of the Rubber Industry elected Fletcher Chadwick, director and general manager of the Preston Tire Fabric Mfg. Co., Ltd., an honorary member, the first to be so honored.

The following meetings have been arranged by the London Section of the Institution of the Rubber Industry for the season 1942-43: October 12, Symposium on "Factice"; November 9, "Available Wild Rubbers", Geo. Martin; December 14, Symposium on "Uses and Manufacture of Oil and Thermal Reclaims"; January 11, "Organic Loading Fillers Which Substitute Rubber", T. R. Dawson; February 8, "Practical Processing of American Synthetic Rubbers", B. J. Habgood and J. T. Watts; March 8, Symposium on "Rubber-Like Dispersions and Emulsions."

The program of the Leicester Section included: September 15, "The Absorption of Oil by Rubber", G. Gee, of the British Rubber Producers' Research Association; October 15, "African Rubber", George Martin, of the London Advisory Committee for Rubber Research (Ceylon and Malaya); November 12, "Reclaiming Processes and Products", J. Lewis, Rubber Improvement, Ltd.

The Manchester Section held a joint meeting with the Manchester Section of the Institute of the Plastics Industry, September 21, when D. N. Davies, of Cellomold, Ltd., read a paper on "Rubber-Like Plastics from Polyvinyl Polymers."

Motor and Other Oils from Rubber

Mention has been made in these columns of Japanese claims that they are producing high-grade motor oil from rubber in Malaya. Later reports from the Domei News Agency state that it is the Malayan Rubber Research Institute, now under Japanese direction, which is engaged in this work. The Institute is producing from rubber high-grade gasoline, Diesel-oil, lubricating oil, anti-malarial oil, and other materials by refining the rubber oil; and a factory is being built near the Institute at Kuala Lumpur to develop the refining process.

Referring to these reports, a writer, H. A. (*presumably Herbert Ashplant*), in *The India Rubber Journal*, recalls results he obtained in South India some years ago, when he was investigating the claims of a pharmacist in the Federated Malaya States that he had been able to obtain valuable spirit from crude rubber by distillation. H. A. states that from 20 pounds of tree scrap he obtained 4,176 cubic centimeters light oil A, sp. gr. 0.816, and 1,710 cubic centimeters heavy oil B, sp. gr. 0.8572.

By fractional distillation at rising temperatures 100 cubic centimeters light oil A yielded: at 100° C., 24 cubic centimeters light orange spirit; at 120° C., 20 cubic centimeters light yellow spirit; at 145° C., 18 cubic centimeters very light yellow spirit. The residue left after these distillates had passed over consisted of 38 cubic centimeters brown heavy oil, resembling in appearance B of the first distillation.

Fractional distillation of 100 cubic centimeters of the heavy brown oil B at the same temperatures yielded respectively: six cubic centimeters light orange spirit; seven cubic centimeters light yellow spirit; 30 cubic centimeters very light yellow spirit.

Altogether the oils A and B, when purified, yielded 52½% of their combined initial volume of light-colored volatile spirit. Some motor cycles and an automobile were run for short periods on this spirit, but as rising rubber prices soon afterward eliminated the reason for the tests, they were discontinued, and no reports are available on the efficiency of the rubber spirit or of possible detrimental effects on the motor engines.

On the basis of the above results it is calculated that one ton of dry rubber would yield 77 gallons of light spirit. With suitable plant, the necessary experts, and proper treatment, higher yields are naturally obtainable, but it is not considered likely that the Japanese would have other than primitive equipment at their disposal, for the present at least. However, even so, the Japanese might be able to handle 100,000 tons of crude rubber from which they would, according to the above calculations, obtain over 180,000 barrels of oil, an amount that would form a substantial contribution toward easing their present fuel needs for shipping and other purposes.

New Companies Recently Organized

A number of companies planning to specialize in some branch of the plastics industry have recently been formed, including:

Shelco (Engineering & Plastics), London, capital, £7,000, to make articles of plastics.

Plasticraft, Ltd., Surrey, capital, £2,000, to manufacture and deal in all kinds of plastics, imitation horn, shell, whalebone, etc.

V & E Plastics, Ltd., Birmingham, capital, £1,200, to manufacture plastic goods and compounds.

Paynes Plastics Products, Ltd., Nottingham, capital, £1,000, to specialize in goods of plastics, rubber, and rubber substitutes.

Plastics & Rubber Machinery Co., with headquarters in London and a branch in Manchester, will take over the business of the Latex Engineering Co., Manchester, producer of proofing-plant, dry-heat stoves, mixers, grinders, calenders, etc. While continuing this business, the new concern will specialize in hydraulic molding presses and pumps for the plastics industry and all kinds of rubber machinery, in cooperation and association with the Planters Engineering Co., Ltd., London, and Bolton.

Rubber Control Extended

Two new orders restricting the use of rubber, which came into force on September 17, deal with belting and hose. The first further limits the amount of crude rubber or balata that may be used in the production of conveyer, elevator, or transmission belting and prohibits the manufacture of certain types altogether. Similar rulings apply to hose. The use of colored rubber is restricted to essential purposes. All-rubber hose is forbidden.

LATIN AMERICA

BRAZIL

Social and Economic Development

Reports of the operations carried out and planned for the immediate future in the less accessible parts of Brazil and neighboring republics in connection with United States efforts to secure rubber and other vital raw materials reveal that an incalculably far-reaching impetus is being given to the social and economic development of the practically unknown interior of South America. Many districts, abandoned years ago, or even in some cases quite unexplored, are receiving an influx of workers attracted by the promise of wages formerly undreamed of. Houses, roads, hospitals, and stores will be built for the workers' convenience. Special sanitary measures will protect them from disease as far as possible, and good food will help build up their strength and resistance. Where whole families have migrated, schools are contemplated. Airplanes will play their part in developing the wild interior, and airports, easier and quicker to build than highways and railroads, will spring up in little-known regions and thus make it possible to bring the wealth of vast unexplored areas, now several perilous months' journeying away from transportation centers, quickly to the Coast and to the United States.

Salvaging Campaign

War restrictions and scarcities have forced Brazil to the utmost economy in the use of available materials that were formerly imported, and to this end she has embarked on an intensive and well-organized campaign of salvaging and re-using worn articles formerly consigned to the dump heap. Well-equipped salvage shops, really small factories, handle the scrap, and much ingenuity is shown in turning old things into new. The articles mainly collected are of metal, but rubber goods also receive attention.

There is an elaborate and efficient retreading plant where bus and automobile tires are recapped, by which means the life of a tire is said to be extended to about 40,000 miles. Tires unfit for retreading have the surface rubber ground off, and the resultant

rubber powder is used in insulating and silencing pads for street-car tracks. The remaining carcass is treated with a special solution, eventually yielding a sponge rubber for which various uses have been found. The beads yield high-grade wire which, after being straightened, is suitable for armature winding and different kinds of small springs.

Old street-car curtains of rubber-impregnated materials are cut up and used for insulating pads for motor field coils for street cars and for insulating wrapping for armature coils. It is said that two thicknesses of the curtain material gives as good service as one thickness of impregnated canvas.

Exports

Brazil's manufacturing industry is expanding steadily and is not only supplying an ever-increasing variety of articles for home consumption, but also a surplus for export to neighboring South American countries and even to the United States. A few months ago the *Boletim do Conselho Federal de Comercio Exterior* revealed that the Brazilian consul in Boston had reported that modish galoshes of Brazilian manufacture had met with much favor not only in that city, but also in other commercial centers in New England. These articles are entirely of Brazilian materials and by Brazilian labor and have been especially praised for style and workmanship. One interested party was said to be considering the purchase of up to one million pairs of these galoshes.

Export figures for 1941 show that Brazil exported 65,786 kilograms of rubber footwear and galoshes, value 1,641,524 milreis ($75,000), and that they formed by far the most important exports among rubber goods. Other rubber articles exported were: tires, 37,544 kilograms, value 761,525 milreis ($39,500); inner tubes, 3,271 kilograms, value 64,241 milreis ($3,230); rubber sheets combined or not with fabric, 3,184 kilograms, value 82,604 milreis ($4,250); belting, 2,469 kilograms, value 43,141 milreis ($2,230); combs and similar articles, 31,072 kilograms, value 1,338,780 milreis ($69,000); office supplies, 5,109 kilograms, value 114,758 milreis ($5,900); other rubber manufactures, 16,888 kilograms, value 307,164 milreis ($15,900).

NOTES

Uruguay is expected to produce 33,154 metric tons of sunflower seed in 1942-43 on 59,586 hectares. Sunflowers are among the plants that the Russians have been investigating as sources of rubber. Our August issue gave details of these experiments, and some of the yields of rubber that have been obtained. These are on the low side, but are considered promising; the rubber is not likely to be too expensive as it would be in the nature of a by-product from a plant already valuable as a source of oil.

Chile is one of the few South American countries whose climatic conditions do not favor the cultivation of *Hevea brasiliensis* and allied rubber-bearing trees. However in the central portion of the country various sub-tropical fruits are successfully grown, and it has now been considered that the region might also prove suitable for guayule. Consequently experiments are to be conducted with this shrub along the Aconcagua River, near Quillota.

Palestine

The Palestine War Supply Board is reported to have undertaken the establishment of a rubber reclaiming factory with annual output of 300 tons.

Liberia

Rubber has become by far the most important export from Liberia. In 1941 shipments totaled 18,080,788 pounds, value $4,275,513, compared with 14,015,614 pounds, value $2,645,573, in 1940.

Editors' Book Table

BOOK REVIEWS

"Annual Report on the Progress of Rubber Technology." Vol. V. 1941. Published by the Institution of the Rubber Industry, 12 Whitehall, London. S.W.1., England. Paper, 7¼ by 9¾ inches, 145 pages. Subject and author indexes. Price: I.R.I. members, 2/6; non-members, 10/6.

Volume V of this series summarizes progress during 1941 in the principal branches of rubber technology and manufacture. The 24 chapters are on the same subjects as in Volume IV, but the trend of the times is reflected in the chapter on properties, applications, and utilization of latex being 10 pages shorter, the chapter on compounding ingredients, accelerators, antioxidants, and softeners being four pages shorter, and the chapter on synthetic rubber being two pages longer. Patent and literature references on synthetic rubber have increased from 132 in the 1940 report to 240 in the 1941 report. Subjects covered by leading authorities include latex and synthetic rubber, as mentioned above, and also planting, chemistry of rubber, testing, compounding ingredients, fibers and textiles, and vulcanized rubber. New developments in the manufacture of tires, belting, hose and tubing, electrical insulation, footwear, sporting goods, mechanicals, flooring, roads, surgical goods, hard rubber, and textile-rubber composites are also reviewed. Patent and literature references on all subjects total 1,335, as compared with 1,281 for 1940. This annual report, which has no exact parallel in the United States, has been a commendable contribution as a review of the literature from all countries.

"Chemical Engineering Catalog. 1942-43." Twenty-seventh Annual Edition. Published by Reinhold Publishing Corp., 330 W. 42nd St., New York, N. Y., Cloth, 8½ by 11⅛ inches, 1336 pages. Indexed.

Over 550 firms provide concise and accurate information as to the equipment, supplies, and raw materials needed by the process industries. Trade names, industrial chemicals and raw materials, laboratory and reagent chemicals, technical and scientific books listed by author and subject, and various charts, tables, and nomographs are included, as in previous editions of the catalog.

"Industrial Research." F. Russell Bichowsky. Chemical Publishing Co., 234 King St., Brooklyn, N. Y. 1942. Cloth, 5½ by 8½ inches, 132 pages. Price $2.50.

The importance of research in our national life and the general principles of management and organization which have proved successful in the laboratory are outlined for the consideration of the research director and the business executive who are faced at some time or other with the advisability of expanding their present research laboratory or establishing one for the first time. The pre-natal and post-natal factors of invention, the status of the small company in the research field, and the place of research in company organization are also analyzed. A chapter on technical control of the laboratory treats of the rights of the inventor, the use of advertising, financial control of research, salaries, and competition.

"Chemical Engineering for Production Supervision." David E. Pierce. Chemical Engineering Series. First Edition, 1942. Published by McGraw-Hill Book Co., 330 W. 42nd St., New York, N. Y. Cloth, 9¼ by 6¼ inches, 232 pages. Appendix contains steam tables and table of properties of Dowtherm "A" and table of standard pipe dimensions. Index.

This very timely book was written from the notes used by the author during the past year in his assignment to direct an Engineering Defense Training Course for non-technical men on this subject. The book gives a clear, accurate understanding of the principles of chemistry, physics, and thermodynamics most needed by the operating man. How these basic principles apply to five of the most important unit operations of chemical plant production, such as heat transfer, evaporation, distillation, drying, and fluid flow are explained without overburdening the reader with theoretical proof of formulas or discussion of the numerous variables involved in detail of design. Illustrative examples are worked out

in great detail so that each step in the calculation is clear. There are 230 typical problems covering all phases of the subjects, and they give the reader realistic practice in selecting data and translating it into useful form. This book should be of invaluable assistance to the many new and old production supervisors in the rubber industry, particularly for those who will be working in the synthetic rubber plants.

"Resins—Rubbers—Plastics." Loose-Leaf Abstract Service. Edited by H. Mark and E. S. Proskauer. Interscience Publishers, Inc., 215 Fourth Ave., New York, N. Y. Price $35.00 per year. 6½ by 9½ inches in binder. 400 pages (through September).

This monthly service, started with January, provides a close check-up of the scientific and technical literature so necessary in order to avoid loss of time and money by duplication of work that has already been described. It should be invaluable to executives, research chemists, and engineers, and in fact all workers in these fields, particularly during this period when time is so short.

The abstracts are prepared in a very comprehensive manner in that they contain most of the data and facts of the original paper and reproduce important graphs, diagrams of apparatus, and other necessary illustrations, and in most cases it would not be necessary to consult the original literature. The service will furnish about 1,000 abstracts a year, summarizing articles from more than 100 domestic and foreign periodicals and will therefore cover the entire field of chemistry, physics and technology of resins, rubbers, plastics and high polymeric substances. Each abstract is provided with a file number. An index to a specially adapted decimal system and method of filing gives two main headings: General and Special. The first will include division and classification into the various fundamental properties and process of these materials and will combine all information that does not refer to a specific chemical compound or group of substances. The Special Part will be divided into sections on various substances or substance groups, such as resins (acrylic, phenolic, vinyl, shellac, and natural), rubbers (natural, butadiene, chloroprene, polysulphide, vinyl, isobutylene), and fibers (cellulose, protein, nylon, vinyon). If an article contains heterogeneous material, several abstract sheets are made, each of which deals with only one topic of the article, but all of which are cross-referenced.

The service provides an up-to-date reference library in which every recent development can be found at a moment's notice.

NEW PUBLICATIONS

"The Storage of 1:3 Butadiene." Pittsburgh-Des Moines Steel Co., Pittsburgh, Pa. 36 pages. This research bulletin is a report on the work done under a Chemical Storage Fellowship at the Mellon Institute of Industrial Research for the above company. The report contains new information and data on variables which affect storage costs, recommendations for type of storage containers, cost data, information regarding corrosive effects on container materials, and deterioration of butadiene during storage. A section on physical constants includes data and charts on specific gravity, specific heats, vapor pressure, and latent heat of vaporization. Sections on chemical properties and methods of preparation give information on catalyzers, inhibiters, and modifying agents in the former, and a review of the most generally accepted methods in the latter. A table of literature references is also included.

"The Neoprenes." E. I. du Pont de Nemours & Co., Inc., Wilmington, Del. 24 pages. This booklet, by D. F. Fraser and N. L. Catton, provides under one cover a listing and description of all types of neoprenes now being manufactured, with a primary classification into slow-curing and fast-curing types. The general principles of compounding for these rubbers is given and also compounding for specific applications such as freeze resistance, flame resistance, sunlight and ozone resistance, oil resistance, low compression set, and high tensile strength. The processing of neoprene compositions and their methods of vulcanization are also explained, and the booklet includes a literature reference on neoprenes which covers previous publications of the company's staff and other authors on this subject.

"The Phosphatides of *Hevea Brasiliensis*." The British Rubber Producers Research Association, 19 Fenchurch St., London, E. C. 3, England. Publication No. 23. 8 pages. This bulletin reports work undertaken as part of an investigation of the non-rubber constituents of latex, in this case the phosphatides (glycerides containing phosphoric acid and a nitrogenous base, a type of lipin). Details of the procedures used to isolate these substances are given together with a discussion of the results which lead the author, G. R. Tristram, to conclude that these phosphatides which aid in maintaining the latex as a stable emulsion are present in latex mostly in the water phase.

"Hercules Ethyl Rubber." Cellulose Products Department, Hercules Powder Co., Wilmington, Del. 8 pages. This pamphlet describes the properties of the soft-plasticized thermoplastic ethyl cellulose, which is suggested as a substitute for natural rubber. This tough, pliable, and flexible material is made without solvents and may be plasticized with a variety of chemicals and oils. Physical properties data for three ethyl cellulose formulations in comparison with two rubber ones are given.

Another booklet, 4 pages, large table of tests on 35 "Ethyl Rubber" compositions and insert containing sample, gives a more detailed description of test methods used for the various formulations tried and gives a more complete discussion of the test results obtained than does the above small pamphlet. The material is suggested as a soft plastic to substitute for rubber in some mechanical goods and sundries.

"Security and Industry Survey. An Analytical Guide for Investors." Merrill Lynch, Pierce, Fenner & Beane, 70 Pine St., New York, N. Y. August, 1942. 44 pages. The latest edition of this quarterly report summarizes for investment purposes current prospects for the rubber and tire, petroleum, chemical, and other industries.

"Softener Study 2A for Type OR-15 Hycar Synthetic Rubber." Hycar Chemical Co., Akron, O. 24 pages. This booklet contains information on available softeners and plasticizers which is largely a result of evaluations that have been carried out since the publication of the original Hycar Softener Study (Vol. 2, 1941). Table 1 lists results on 144 materials incorporated in 50 parts; Table 2 lists results on 58 materials incorporated in 30 parts, and Table 3 gives comparative data on eight materials incorporated in both 30 and 50 parts. Table 4 is a list of 14 selected softeners, listing them according to their preference for providing the best results on certain items such as ease of incorporation, high tensile, low temperature flexibility, etc. Table 5 gives about 100 additional materials tested which are not reported in this new booklet, but about which information will be furnished on request. It has been found by experience that in most cases more accurate evaluations and data that correlated closely with those obtained in factory operations resulted from the use of 30 instead of 50 parts of softener in the test recipe.

"Rubber Guide Book for American War Industries." The B. F. Goodrich Co., Akron, O. 32 pages. The application and properties of various products for industrial and aeronautical purposes using natural, synthetic, or reclaimed rubber are discussed in this illustrated booklet. Sub-zero test data, diameter, volume, thickness and hardness tests in oil, and suggested uses for various Ameripol compounds are given.

"Hercules Chemist." Nos. 9, 10, and 11. Hercules Powder Co., Wilmington, Del. A variety of chemical products are described in these attractive booklets. Those of interest to the rubber industry include Flexalyn (No. 9), an extremely tacky rosin ester useful in adhesives manufacture, and Hercolyn (No. 11), which is used as an extender for latex as well as for other purposes. Also discussed in No. 11 are a golf ball of injection molded cellulose said to be about 95% as good for distance and scoring possibilities as the rubber thread ball, and "Ethyl Rubber." Rubber conservation through use of high-strength rayon cord in tire fabrication, belting, and hose is suggested. "Cellulose, a Blueprint for Plastics", an article in three installments, is complete in these issues. Part three briefly reviews the current knowledge of molecular-weight distribution of polystyrene and polyisobutylene.

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Patents and Trade Marks

APPLICATION

United States

22,167. (Reissue). **Fabric Dress Gloves Having a Multiplicity of Small Rubber Grip Elements Embedded in the Front Portions of the Glove.** W. O. Wells, Evanston, Ill., and C. K. Waite, Louisiana, Mo., assignors to Wells Lamont Smith Corp., Chicago, Ill.

2,292,401. **Pulsator with Diaphragm for Milking Machines.** B. V. Orre, Stocksund, Sweden.

2,292,435. **Window Washing Apparatus with Rubber Squeegees.** L. C. Crites, Wooster, O.

2,292,445. **Wear Piece of Flexible Plastic Material for Furniture.** C. F. Hilldring, Akron, O., assignor to American Hard Rubber Co., New York, N. Y.

2,292,466. **Rubber Splash Shield for Shoe Heel.** C. F. Norlin, Chicago, Ill.

2,292,527. **Therapeutic Air Pump with Flexible Sleeve-Like Bellows.** H. T. Kraft, assignor to General Tire & Rubber Co., both of Akron, O.

2,292,539. **Type Impressible Stencil Consisting of a Sheet of Rubber Chloride Impregnated with Flock.** W. H. Nichols, Port Washington, N. Y., assignor, by mesne assignments, to Remington Rand, Inc., Buffalo, both in N. Y.

2,292,554. **Electrical Plug with Resilient Body.** P. Weeber, Chicago, Ill.

2,292,560. **Printing Roll Comprising a Metal Roll Member and a Plurality of Hard Vulcanized Pads Bearing Insignia Vulcanized in Place thereon.** H. L. Boardman and M. L. Hendrix, both of Longview, Wash.

2,292,675 and 2,292,676. **Rubber Ball and Socket Joint.** L. F. Thiry, Montclair, N. J.

2,292,689. **Silencer Comprising an Elastic Sleeve Adapted to Be Telescoped over the End of a Hush Tube of Flush Tanks.** W. V. Heare, assignor, by mesne assignments, to J. M. Bales, both of Los Angeles, Calif.

2,292,752. **Tubing of Elastic Material.** A. H. Gee, assignor to Shering & Glatz, Inc., both of New York, N. Y.

2,293,017. **Valve with Rubber-Like Cup-Shaped Member.** M. A. Gleeson, assignor to Crane Co., both Chicago, Ill.

2,293,132. **Valve Core, Container, and Rubber Bodied Valve Stem.** H. Z. Gora, assignor to Jenkins Bros., both Bridgeport, Conn.

2,293,246. **Reenforced Vulcanized Fiber Backing Belt.** H. B. Fay, Willoughby, O.

2,293,266. **Apparatus for the Production or Storage of Fluorine Having Insulating and Sealing Materials Prepared from Rubber or Artificial Rubber, Predominantly Conjugated Dienes by Treatment with a Compound from the Group Consisting of Alkali Metal Polyfluorides and Hydrofluoric Acid.** J. A. M. W. Mitchell, Runcorn, England, assignor to Imperial Chemical Industries, Ltd., a corporation of Great Britain.

2,293,374. **Repair Device for Rubber Articles, Comprising a Mushroom-Shaped Plug Having a Head and Stem Section Formed Wholly of Sponge Rubber with an Impervious Outer Skin.** W. J. Wesseler, East Cleveland, O.

2,293,407. **Speed Reduction Gear with a Plurality of Resilient Rubber Inserts Mounted in the Friction Wheel.** H. Schirrmeister, Berlin-Siemensstadt, Germany, assignor to Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

2,293,493. **Bead Molding Comprising a Strip of Thin Metal and a Thin Covering of Solidified Plastic Encasing the Bead.** O. J. Crowe, Detroit, Mich.

2,293,589. **Packaging Material Which Comprises a Flexible Rubber Hydrohalide Film Having a Covering Which Screens Out Decomposing Light Rays.** W. C. Calvert, Chicago, Ill., assignor to Wingfoot Corp., Wilmington, Del.

2,293,627. **Pantie Foundation Garment.** W. Polesie, assignor to Corsetry Inc., both of New York, N. Y.

2,293,635. **Separable Electric Connector Comprising a Socket Member and a Rubber-Bodied Plug Member.** W. A. Wulle, assignor to Pyle-National Co., both of Chicago, Ill.

2,293,654. **Corset.** J. J. Kispert, Hamden, assignor to I. Newman & Sons, Inc., New Haven, both in Conn.

2,293,714. **Sock with Interlining Comprising a Single Piece of Cellular Expanded Rubber.** E. C. Craig, United States Navy, and G. W. Leyde, Arlington, Va.

2,293,780. **Pocket Syringe.** B. L. Taylor, United States Navy.

2,293,791. **Knee Harness for Rubber Boots.** E. F. Baird, Waltham, Mass., assignor to B. F. Goodrich Co., New York, N. Y.

2,293,818-2,293,819. **Knitted Fabrics Incorporating Elastic Yarn.** A. F. Guyler and W. H. Boaler, both of Spondon, England, assignors to Celanese Corp. of America, a corporation of Del.

2,293,820. **Cleaner with Wiping Strip Having a Body of Rubber-Like Material.** W. C. Hansen, assignor to Chrysler Corp., both of Highland Park, Mich.

2,293,883. **Holding Device Utilizing Suction Cup for Shower Curtains.** H. F. Bossert, New York, N. Y.

2,293,928. **Porous Rubber Article Having a Coating Layer of Rubber Pervaded by a Multitude of Crater-Shaped Pores, the Individual Pores Being Relatively Small in a Zone Contiguous to the Imperforate Rubber Base Member.** C. L. Beal, Cuyahoga Falls, assignor to American Anode, Inc., Akron, both in O.

2,294,064. **Sanding Head with Annular Rubber Disk Secured to the Backing Plate.** J. O. Amstuz, assignor to Behr-Manning Corp., both of Troy, N. Y.

2,294,066. **Suspensory.** A. Baehler, Youngstown, O.

2,294,101. **Vehicle Door Weatherstripping.** R. W. Tripp, Hudson, Mich.

2,294,193. **Wrench for Spark Plugs with Tubular Cushioning Rubber Member Adapted to Receive Yieldably and to Grip Restrainingly the Annularly Undercut Portion of the Binding Post of the Spark Plug.** H. H. Merriman, assignor to Mechanics Engineering Co., both of Jackson, Mich.

2,294,245. **Polishing Belt.** C. F. Schlegel, Brighton, assignor to Schlegel Mfg. Co., Rochester, both in N. Y.

2,294,452. **Resilient Bushings.** F. M. Guy, assignor to Guy & Murton, Inc., both of Detroit, Mich.

2,294,541. **Rock Drill Support with a Fixed Rubber Tubular Arm with a Circular End Socket.** A. Feucht, Garfield Heights, assignor to Cleveland Rock Drill Co., Cleveland, both in O.

2,294,608. **Electrical Connecter Plug with Resilient Body Member.** W. A. Rudolphsen, Richmond, Ind., assignor to Belden Mfg. Co., Chicago, Ill.

2,294,654. **Hat Band Comprising a Layer of Leather and a Knitted Fabric United by a Layer of Latex Cement Free of Fillers to Form Spaced Particles Permitting Passage of Air therethrough.** H. Cooper, West Philadelphia, Pa.

2,294,674. **Combination of Two Plates and a Yielding Rubber Connection between the Plates Projecting from the Faces of the Plates in Shear Relation.** T. Lord, Millcreek Township, assignor, by mesne assignments, to Lord Mfg. Co., Erie, both in Pa.

2,294,816. **Welding Torch Soldering Tip Embodying an Elastic Fitting.** L. E. Trabbic, Toledo, O.

2,294,818. **Resilient Wheel with Rubber Segments.** A. O. Williams, Battle Creek, assignor to Clark Equipment Co., Buchanan, both in Mich.

2,294,821. **V-Type Belt.** C. W. Yelm, assignor to Gates Rubber Co., both of Denver, Colo.

2,294,839. **Bicycle Steering Post with Tubular Rubber Blocks Sleeved on the Post.** T. I. Duffy, Detroit, assignor to E. M. Benedict, Highland Park, both in Mich.

2,294,840. **Spectacles with Ear Engaging Portions Having Removable Thin Cap Members of Elastic Material.** M. Dunn, Birmingham, Ala.

2,294,900. **Gum Massage Appliance Comprising Massaging Elements Joined to a Handle and Consisting of a Rubber Core Covered with a Sponge Rubber Sheath.** L. L. Fuller, Goldfields, Sask., Canada.

2,294,919. **Electric Cable, Comprising a Conductive Core with Three Coaxial Layers Comprising Helically Wound Strips of Synthetic Resin Having High Dielectric Properties.** J. B. Lunsford, Washington, D. C.

2,295,011. **Windshield Wiper.** R. A. Rodrick, Akron, O.

2,295,029. **Power Transmission Belt.** J. M. Cooney, Akron, and W. B. Collier, Tallmadge, both in O., assignors to B. F. Goodrich Co., New York, N. Y.

2,295,223. **Non-flood Cover for Storage Battery Cells.** R. G. Le Clercq, assignor to Pacific Hard Rubber Co., both of Los Angeles, Calif.

2,295,236. **Rubber Valve Stem.** I. W. Robertson, La Grange, Ill., assignor, by mesne assignments, to Dill Mfg. Co., Cleveland, O.

2,295,269. **Ventilated Railway Car Wheel with Springs Comprising Elastic Shear Elements.** E. H. Piron, New York, N. Y., assignor to Transit Research Corp., a corporation of N. Y.

2,295,282. **Resilient Mounting for Abrasive Wheels.** A. W. Mall, Flossmoor, Ill.

2,295,316. **Joint with Rubber Joining the Members and Surrounding and Bonded to the Projections.** T. L. Yates, Millcreek Township, Erie County, assignor, by mesne assignments, to Lord Mfg. Co., Erie, both in Pa.

2,295,363. **Spongy Rubber Cushion.** J. F. Schott, assignor to Mishawaka Rubber & Woolen Mfg. Co., both of Mishawaka, Ind.

2,295,424. **Rubber Pump Impeller for Rotary Pumps.** F. C. Picut, West Orange, N. J.

2,295,432. **Belt Consisting of Strong Fabric Impregnated with Soft Rubber, Coated on Both Sides with a Layer of Soft Rubber Containing Almost Wholly Collapsed Closed Cells and the Outer Surface Pitted with Vacuum Cups.** W. L. Smith, Bedford, Va., assignor to Salta Corp., Jersey City, N. J.

2,295,491. **Detachable Heel with a Rubber Layer.** C. Schreck, New York, N. Y.

2,295,520. **Truck Frame Having Spaced Pedestals with Rubber Pads in Shear.** P. Parke, assignor to Pullman Co., both of Chicago, Ill.

2,295,607. **Corselette.** I. Rosner, assignor to Even-Pul Foundations, Inc., both of New York, N. Y.

2,295,613. **Dry Gummed Sheet Material with Rubber Interface.** C. W. Stillwell, assignor to Dennison Mfg. Co., both of Framingham, Mass.

2,295,658. **Ampule Closure with Compressible Hemispherical Liner.** E. E. Hogg, New Kensington, assignor to Aluminum Co. of America, Pittsburgh, both in Pa.

2,295,659. **Bathing Cap.** T. J. Howland, Long Branch, N. J.

2,295,678. **Mud Pump Piston Having on Its Periphery a Multiplicity of Flanges, with Rubber Molded around and between Them Forming the Entire Cylinder-Wall Engaging Surfaces of the Piston.** E. E. Miller, Fullerton, Calif.

2,295,708. **Toy Balloon Comprising Inner and Outer Layers of Differently Colored Rubber, the Outer Layer Being Wrinkled whereby, When the Balloon Is Inflated, a Two-Tone Color Effect Results.** R. E. Bitter, assignor to Vultex Chemical Co., both of Cambridge, Mass.

2,295,746. **Fountain Comb with Rubber Bulb.** N. R. Metzler, York, Pa.

2,295,761. **Poultry Picking Apparatus with Soft Rubber Picker Disks.** R. H. Smith, Chatham Township, N. J.

2,295,772. **Combined Valve Facing and Securing Means with a Facing for Spigot Heads of Elastic and Resilient Material in the Form of a Thimble.** W. J. Campbell, assignor to Keystone Brass & Rubber Co., both of Philadelphia, Pa.

2,295,774. **Pump Valve with Spherically Shaped Rubber Body Portion.** J. Corydon and H. E. Hollberg, both of Providence, R. I.

2,295,815. **Inflated Playing Ball of Single Wall Thickness Formed of a Vulcanized Homogeneous Compound Containing Rubber, Leather Flour, and a Thermoplastic Ingredient.** C. A. Webb, assignor to C. B. Webb Co., both of Lebanon, Pa., a copartnership composed of C. B. and G. I. Webb.

2,295,817. **Vacuum Cup Vibratory Massager.** C. P. Winther, Paynesville, Minn.

2,295,829. **Vibration Dampener with a Pair of Superposed Rubber Disks.** B. G. Carlson, Willobee, assignor to Weatherhead Co., Cleveland, both in O.

2,295,847. **Infant's Rubber Feeding Spoon.** G. B. Hume, Claremont, Calif.

2,295,874. **Adapter for Well Pipes with a Ring of Rubber between the Faces of the Collar and Pipe.** F. Stone, Redondo Beach, and A. L. Stone, Palos Verdes Estates, assignors to Hydril Co. of California, Los Angeles, all in Calif.

2,296,024. **Refrigerating Apparatus with a Sealing Gasket Having a Pocket.** E. D. Drake, Grand Rapids, assignor to Nash-Kelvinator Corp., Detroit, both in Mich.

2,296,111. **Resilient Safety Shoe for Hoofed Animals.** H. A. Mahar, Brooklyn, assignor of 30/100ths to E. J. McHugh, New York, both in N. Y., and 30/100ths to J. Erdman, Rowayton, Conn.

2,296,151. **Signal Lamp Unit with a Long and Narrow Body of Flexible Rubber-Like Material Having a Plurality of Spaced Holes for Receiving Electric Lamp Bulbs.** S. M. Dover, Chicago, Ill.

2,296,165. **Corset.** M. Kahn, Cedarhurst, assignor to Artistic Foundations, Inc., New York, both in N. Y.

2,296,299. **Washboard with a Series of Flexible Strips of Rubber Encased Woven Fabric, Forming Contiguous Flexible Tongues.** S. Steinmetz and I. E. Schine, both of Bridgeport, Conn.

2,296,335. **Athletic Protective Headgear with a Layer of Sponge Rubber Externally Secured to the Crown Portion, a Casing of Tough, Durable Rubber Bonded to the Exposed Surface of the Sponge Rubber, and a Padding within the Body Comprising a Toroid of Sponge Rubber Encased and Sealed within a Layer of Air-Impervious Rubber.** D. R. Brady, Highland Park, assignor to D. R. Brady and J. Windsor Davis, as joint trustees for Brady Research Co., Detroit, both in Mich.

2,296,449. **Drapery Hook Guard Comprising a Heat and Solvent Resistant Vulcanized Synthetic Elastic Polymer.** A. Meisenheimer, Milwaukee, Wis.

2,296,471. **Bowling Alley Approach with a Take-off Mat of Resilient Material Flush with the Adjoining Surface.** R. E. Kennedy, Toronto, Ont., Canada, assignor to Brunswick-Balke-Collendar Co., Chicago, Ill.

2,296,570. **Intercooler Apparatus with Flexible Perforated Sheet of Rubber for Sealing the Connection between Tube Sheets and Conducting Tubes.** H. P. Peterson, assignor to Bush Mfg. Co., both of Hartford, Conn.

2,296,724. **Refrigerating Apparatus Having a Seal Ring Provided with a Gasket.** A. A. McCormack, assignor to General Motors Corp., both of Dayton, O.

2,296,740. **Double-V Belt with a Plurality of Superimposed Rubberized Fabric Layers.** V. G. Reiling, assignor to Dayton Rubber Mfg. Co., both of Dayton, O.

2,296,853. **Rail Joint for Connecting the Ends of Track Rails, with Rows of Rubber Pads Arranged on Opposite Sides of the Rails.** K. L. Johnson, Allison Park, Pa., assignor to Hubbard & Co., a corporation of Pa.

2,296,854. **Submarine Cable Insulation Comprising Polymerized Aliphatic Mono-olefins, Crepe Rubber and Sulphur.** A. R. Kemp, Westwood, N. J., assignor to Bell Telephone Laboratories, Inc., New York, N. Y.

2,296,903. **Wrinkle Eradicator Comprising an Elastic Rubber Envelope.** I. D. Brown, Vista, Calif.

2,296,949. **Brush Structure Including a Channel Strip of Sheet Metal, Bristles Gripped within and a Layer of Soft, Plastic Material Interposed between the Sides of the Channel and the Bristles.** C. Roberts, Winchester, Mass., assignor to United Shoe Machinery Corp., Flemington, N. J.

2,297,019. **Storage Battery Cell Cover.** G. A. Paddock, Stow, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,297,127. **Pneumatic Cushion.** C. L. Beal, Cuyahoga Falls, assignor to American Anode Inc., Akron, both in O.

2,297,413. **Tubing with an Inner Lining of Layers of Rubberized Fabric, Layer-Fastening Means to Hold Them together, and a Vulcanized Rubber Covering.** W. Jahn, Hanover, and W. Luder, Hanover-Linden, both in Germany; vested in the Alien Property Custodian.

2,297,483. **Elastic Connecting Link Having an Elastic Sleeve.** K. K. Kuhne, Hanover, Germany; vested in the Alien Property Custodian.

2,297,506. **Elastic Mounting or Bearing for Supporting an Aircraft Engine.** F. Schmidt, Hamburg-Harburg, Germany; vested in the Alien Property Custodian.

2,297,552. **Arch Support Adapted for the Exterior of a Shoe.** E. F. Hansen, Detroit, Mich.

2,297,575. **Detachable Gun Sight Comprising an Elastic Band to Be Slipped over the End of a Gun Barrel.** G. H. McLean, Jackson, Tenn.

2,297,585. **Rubber Products Having a Coating of an Adhesive Setting Agent Capable of Dissolving without Injury to the Goods for Imparting Elasticity thereto.** T. L. Shepherd, Portslade, England, assignor to Clark Thread Co., Newark, N. J.

2,297,600. **Assembly for Supporting a Conductor of Electric Currents Comprising a Supporting Pin with a Cushioning Layer of Resilient Rubber Covering the End Portion.** R. H. Williams, Chicago, Ill., assignor to B. F. Goodrich Co., New York, N. Y.

2,297,619. **Motor Coupling with Hard Rubber End Portions and a Resilient Rubber Body Portion.** A. H. Haberstump, assignor to Murray Corp. of America, both of Detroit, Mich.

2,297,656. **High Overshoe with Estensible Stockinet Lining.** L. H. L'Hollier, Waltham, Mass., assignor to B. F. Goodrich Co., New York, N. Y.

2,297,657. **Quickly Removable Overshoe.** L. H. L'Hollier, Waltham, Mass., assignor to B. F. Goodrich Co., New York, N. Y.

Dominion of Canada

406,765. **Windshield Wiper.** Trico Products Corp., Buffalo, N. Y., assignee of E. C. Horton, Hamburg, and A. C. Scinta, Buffalo, co-inventors, both in N. Y., U. S. A.

406,771. **Sandblasting Stencil Comprising Tough Vulcanized Rubber, Whiting, Lithopone, Shellac, Sulphur, Tetramethylthiuram Disulphide, and Zinc Oxide.** Van Cleef Bros. (a partnership consisting of N., F., and P. Van Cleef) assignee of C. E. Frick, both of Chicago, Ill., U. S. A.

406,803. **Shoe and Foot Saver Including a Rubber Outsole.** V. Zucker, Omaha, Nebr., U. S. A.

406,847. **Resilient Mounting for Vibratory Bodies.** Canadian Controllers, Lt., Toronto, Ont., assignee of J. F. Frese, Baltimore, Md., U. S. A.

406,832. **Vacuum Connection Utilizing Elastic Tube Means.** General Mills, Inc., assignee of A. R. Wylie, both of Minneapolis, Minn., U. S. A.

406,844. **Paper Feeding Device with Stripper Roll Having a Plurality of Removable Rubber Strips Mounted thereon.** Remington Rand, Inc., Buffalo, assignee of K. J. Braun, North Merrick, Long Island, both in N. Y., U. S. A.

406,900. **Resilient Shoe Insole.** M. Margolin, Elgin, Ill., U. S. A.

406,935. **Hose and End Coupling Construction Comprising a Laminated Flexible Hose of Reenforced Rubber Composition.** Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of J. A. Muller, Paterson, N. J., U. S. A.

406,957. **Puncture-Sealing Inner Tube with Grill-Like Layer of Rubber Composition Integrally Bonded to the Tubular Wall at the Tread Region.** Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of A. N. Iknayan, Indianapolis, Ind., U. S. A.

406,967. **Aircraft Deicer Apparatus.** B. F. Goodrich Co., New York, N. Y., assignee of R. S. Colley, Kent, O., both in the U. S. A.

406,992. **Bottle Closure with Cushion Liner.** Peters Bros. Rubber Co., Inc., assignee of C. S. Jackson, both of Brooklyn, N. Y., U. S. A.

407,003. **Inflatable Game Ball.** A. G. Spalding & Bros., Inc., Chicopee, assignee of M. B. Reach, Springfield, both in Mass., U. S. A.

407,019. **Package of Rindless Cheese Wrapped in Rubber Hydrochloride Film, Cured** *in Situ*. Wingfoot Corp., Wilmington, Del., assignee of B. F. Davis, Arena, Wis., both in the U. S. A.

407,032. **Stretchable Rubber Thread Having a High Resistance to Needle Cutting, with a Core and an Integral Tape Wrapped Entirely Around It.** International Latex Processes, Ltd., St. Peter's Port, Channel Islands, assignee of E. Hazel, North Kingstown, R. I., U. S. A.

407,097. **Exhaust Machine for Lamps, Etc., with Rubber Conduit Adapted to Receive the Exhaust Tube.** Canadian Westinghouse Co., Ltd., Hamilton, Ont., assignee of D. Mullan, Kearny, N. J., U. S. A.

407,201 and 407,202. **Composite Film for Stereoscopic Prints, Comprising a Plurality of Superimposed Sheets of Polyvinyl Alcohol.** E. H. Land, Cambridge, Mass., U. S. A.

407,229. **Blackboard Eraser with Cellular Latex Block.** American Crayon Co., Sandusky, O., assignee of J. H. Oxley, Watertown, Mass., both in the U. S. A.

407,290. **Stiffening Member for Shoes, Impregnated with Synthetic or Natural Rubbers, Hydrogenated Rosin, and a Plasticizer.** Hercules Powder Co., Wilmington, Del., assignee of C. H. Boys, Drexel Hill, Pa., both in U. S. A.

407,305. **Coated Roofing Material Having Incorporated therein a Synthetic Resinous Plastic Material (Vinyl Acetate and Chloride, Carbamide Resin, Cinnamene, Etc.).** Minnesota Mining & Mfg. Co., assignee of L. A. Hatch, both of St. Paul, Minn., U. S. A.

407,328. **Shoe Finishing Wheel Comprising an Inflatable Pad Having Spaced Ribs on the Sidewalls Arranged to Produce a Bumping Effect on the Work Piece.** United Shoe Machinery Co. of Canada, Ltd., Montreal, P. Q., assignee of R. W. Cummings, Beverly, Mass., U. S. A.

407,387. **Tube Coupling with Elastic Yieldable Ring.** A. L. Parker, Cleveland, O., U. S. A.

407,433. **Aircraft Deicer.** B. F. Goodrich Co., New York, N. Y., assignee of M. R. Bell, Los Angeles, Calif., and C. S. Stebbins, Akron, O., co-inventors, all in the U. S. A.

407,445. **Open-hole Tool Joint Protector, Comprising a Rubber Sleeve.** Patterson-Ballagh Corp., Los Angeles, assignee of DeM. G. Miller, San Marino, both in Calif., U. S. A.

407,460. **Rayon Cord Tire.** Wingfoot Corp., Wilmington, Del., assignee of G. D. Mallory, Akron, O., both in the U. S. A.

407,493. **Rubber Glazing Strip for Multiple Glass Sashes.** Adlake Co., Chicago, Ill., assignee of C. M. Verhagen, Elkhart, Ind., both in the U. S. A.

407,547. **Tire Tread wherein Portions of the Tread Are Inclined in Opposite Directions on Opposite Sides of the Midplane of the Tire.** Dunlop Tire & Rubber Goods Co., Ltd., Toronto, Ont., assignee of J. A. Atwood, Oakland, Calif., U. S. A.

United Kingdom

546,712. **Valve.** Wingfoot Corp.

546,776. **Distensible Members Suitable for Operating Aircraft or Other Brakes.** Dunlop Rubber Co., Ltd., and N. E. Hickin.

546,812. **Electrically Heated Wearing Apparel.** United States Rubber Co.

546,828. **Wrapping or Packing Articles for Transport or Storage.** Dunlop Rubber Co., Ltd., A. E. T. Neale, S. G. Ball, and D. F. Twiss.

546,975. **Tire Treads.** Dunlop Rubber Co., Ltd., F. G. W. King, L. J. Lambourn, and F. J. McNally.

546,938. **Aircraft or Other Vehicle Wheels.** Dunlop Rubber Co., Ltd., and H. J. Butler.

546,986. **Safety Tire.** United States Rubber Co.

547,078. **Foundation Garments.** L. J. A. Amyot.

547,121. **Tires.** United States Rubber Co.

PROCESS

United States

2,292,423. **Mildew-Resistant Fibrous Products.** R. V. Yohe, Cuyahoga Falls, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,292,455. **Making Stretchable Footwear by Forming a Rubber Layer on the Surface of a Form of the Desired Size, Removing the Layer to a Larger Form, Building a Fabric Layer over the Stretched Layer, and Removing the Form to Permit the Rubber to Approach Its Original Size.** L. H. L'Hollier, Waltham, Mass., and F. Wray, Burton on Trent, England, assignors to B. F. Goodrich Co., New York, N. Y.

2,293,568. **Laminating Rubber Hydrochloride to Paper.** J. E. Snyder, Akron, O., assignor to Wingfoot Corp., Wilmington, Del.

2,293,751. **Pew Kneeling Mat, Composed of a Sponge Rubber Base and a Hard Rubber Facing Material.** H. S. May, Great Neck, assignor to Voorhees Rubber Mfg. Co., Inc., New York, both in N. Y.

2,293,927. **Composite Article Including a Layer of Porous Rubber.** C. L. Beal, Cuyahoga Falls, assignor to American Anode, Inc., Akron, both in O.

2,294,071. **Process of Treating Porous Molds to Prepare Them for the Introduction of Liquid Latex for the Production of Molded Rubber Articles, Which Comprises Coating the Surfaces of a Porous Mold with Inert Flaked Material.** M. Carter, Trenton, N. J., assignor, by mesne assignments, to Rubber Products, Inc., Chicago, Ill.

2,294,456. **Rubber Composition Printing Plates Provided with Indexing Means.** J. F. Hawley, Riverside, Ill.

2,294,589. **Forming a Dome-Shaped Rubber Article Having a Spirally Coiled Metallic Ring Embedded therein.** C. C. Waterbury, Chicago, Ill.

2,295,066. **Shaping Rubber Hydrochloride Material to Form a Protective Covering for Hats.** R. J. Weikert, Covington, O.

2,295,735. **Making Rubber Designs by Applying a Coating of Latex on a Base, Applying a Coagulant in a Predetermined Design and Allowing It to Remain in Contact with the Latex until the Desired Thickness of Latex Has Become Coagulated in the Configuration of the Design.** V. H. Hurt, Cranston, R. I., assignor to United States Rubber Co., New York, N. Y.

2,295,763. **Slip-Retarding Shoe Sole.** P. A. Sperry, New Haven, Conn., assignor to United States Rubber Co., New York, N. Y.

2,296,305. **Thin Sheets of Chemically Blown Rubber.** D. Roberts, assignor to Rubatex Products, Inc., both of New York, N. Y.

2,296,372. **Continuous Method of Curing Belting.** J. N. Smith, Salem, and J. M. Bierer, Waban, assignors to Boston Woven Hose & Rubber Co., Cambridge, all in Mass.

2,296,408. **Shallow Impaneling a Permanent Design in both Pile and Carcass of a Limp Woven Pile-Carrying Fabric.** W. R. Todd, assignor to Sponge Rubber Products Co., both of Shelton, Conn.

2,296,502. **Composite Rubber and Pile Fabric Floor Mats.** D. R. Cotterman, assignor to Baldwin Rubber Co., both of Pontiac, Mich.

2,296,513. **Producing Rubber Deposits from Latex Emulsion by Relieving the Latex Emulsion of Enclosed Blisters by Atomization of a Jet of the Emulsion by Forcing a Stream of Gas thereon to Form a Cloud of Latex Particles, and Applying the Latex on to a Form.** E. J. Gavatin and B. Steiger, both of Stockholm, Sweden.

2,296,838. **Method of Preparing a Rubber Coated Object Which Comprises Hot Galvanizing a Ferrous Base, Electro-Depositing a Thin Layer of Nickel or Cobalt upon the Surface and Vulcanizing a Rubber Coating thereon.** E. C. Domm, Niles, Mich., assignor to National-Standard Co., a corporation of Mich.

2,297,018. **Making a Sponge Rubber Article of Predetermined Shape and Size by Vulcanizing a Mass of Soft Rubber Containing a Blowing Agent in a Rigid Mold Having the Same Volume as the Compound and in a Larger Mold Having a Volume Less Than That to Which the Blowing Agent Can Expand the Mass at Vulcanization Temperature, and after Completion of the Vulcanization Mechanically Rupturing the Walls of the Cells.** R. L. Overstreet, Bedford, Va., assignor, by mesne assignments, to Salta Corp., Jersey City, N. J.

2,297,022. **Closed Cell Rubber.** H. Pfleumer, New Brunswick, N. J., assignor to Rubatex Products, Inc., New York, N. Y.

2,297,204. **Anti-frictional Article of Vulcanized Soft Rubber Mixed with Fibers.** W. Deissner, Berlin-Lichterfelde, Germany; vested in the Alien Property Custodian.

2,297,309. **Road Marker with a Rigid Base and a Resilient Plastic Facing.** R. J. Limbert, Conshohocken, Pa.

2,297,354. **Method of Adding an Annular Band of Road-Engaging Tread Material to a Pre-Cured Tire Casing That Has a Cured, But Incomplete Crown Tread, Which Consists in Applying to the Crown Surface an Annular Band of Uncured Tread Material and Curing While Confining It within an Annular Mold That Engages Only the Newly Applied Tread.** P. E. Hawkinson, Minneapolis, Minn.

Dominion of Canada

407,133. **Pressure-Sensitive Adhesive Sheet.** Minnesota Mining & Mfg. Co., assignee of W. Kellgren, both of St. Paul, Minn., U. S. A.

407,228. **Recovering Wool from a Mixture of Wool and Solvent-Resistant Rubber by Digesting the Mixture with Sulphur, a Vulcanization Accelerator, and Sufficient Rubber Solvent to Dissolve the Rubber, Continuing the Digestion until the Rubber Is Dissolved, and thereupon Mechanically Separating the Textile Material from the Resulting Solution.** Allied Chemical & Dye Corp., assignee (by its Trustees on Dissolution) of The

Barrett Co., both of New York, N. Y., assignee of R. F. Tefft, Rochelle Park, N. J., both in the U. S. A.

407,375. **Forming an Annular Tube from Liquid Latex.** H. W. Greenup, Fall River, Mass., U. S. A.

United Kingdom

546,741. **Inner Tubes.** United States Rubber Co.

546,895. **Elastic Yarn.** United States Rubber Co.

547,089. **Elastic Laminated Sheet.** United States Rubber Co.

547,103. **Gas-Expanded Latex.** Expanded Rubber Co., Ltd. (Rubatex Products, Inc.).

CHEMICAL

United States

2,292,454. **Process for Making Improved Rubber-Coated Fabrics Which Comprises Treating the Resin-Coated Rubber Coating with a Halogen-Hardening Agent, and Then Applying an Organic Derivative of Ammonia.** C. M. Langkammerer, assignor to E. I. du Pont de Nemours & Co., Inc., both of Wilmington, Del.

2,293,023. **Production of Resins from Sulphur Dioxide and Reactive Olefinic Compounds.** R. C. Hills and M. M. Barnett, both of Port Sulphur, La.

2,293,164. **Process for Preparing a Rubbery, Infusible, Plastic Composition as an Aqueous Dispersion from a Non-Oxidizing, Oil-Modified, Alkyd-Type Resin and a Hydrocarbon-Soluble, Urea-Formaldehyde-Alcohol Condensate.** F. J. Myers, assignor to Resinous Products & Chemical Co., both of Philadelphia, Pa.

2,293,317. **Purification of Vinylidene Chloride.** F. L. Taylor and L. H. Horsley, assignors to Dow Chemical Co., all of Midland, Mich.

2,293,413. **Metal Article with the Surface Provided with a Single Baked-on Polarity Stratified Coating Comprising a Film-Forming Material (Vinyl Alcohol, the Vinyl Halides, the Lower Vinyl Esters, the Lower Acrylic Esters, the Lower Methacrylic Esters, Etc.), and a Resinoid (Non-Oil-Modified, Alkaline Condensed, Bi-functional, Lower Alkyl- and Aryl-Substituted Phenol Aldehyde Resinoids).** F. R. Stoner, Jr., and D. M. Gray, Sewickley, assignors to Stoner-Mudge, Inc., all of Pittsburgh, Pa.

2,293,420. **Corrosion - Resistant Crack - Free Coating, for Shaped Sheet Metal Articles, Comprising an Air-Drying Lacquer Having an after-Chlorinated Polyvinyl Chloride Base.** G. Wick, Bitterfeld, Germany.

2,293,465. **Mercaptothiazolines.** J. E. Jansen, Akron, O., assignor to B. F. Goodrich Co., New York N. Y.

2,294,228. **Plasticized Polyvinyl Acetal Resin.** E. R. Derby, Springfield, Mass., assignor, by mesne assignments, to Monsanto Chemical Co., a corporation of Del.

2,294,353. **Polyvinyl Acetal Resin Plasticized with Diglycol Propionate Phthalate.** J. M. De Bell, Longmeadow, and E. R. Derby, Springfield, both in Mass., assignors, by mesne assignments, to Monsanto Chemical Co., a corporation of Del.

2,294,590. **Alkyd Resins Combined with Amino-Triazine Aldehyde Resins.** H. J. West, Riverside, Conn., assignor to American Cyanamid Co., New York, N. Y.

2,294,848. **Production of Neoprene Cellular Rubber Involving Compounding Followed by Expanding and Vulcanizing, Which Comprises Mixing Magnesium Oxide and Polymerized Chloro-2-Butadiene, Heating and Adding Dry Shellac, Cooling and Adding Zinc Oxide.** G. M. Hamilton, assignor to Callender's Cable & Construction Co., Ltd., both of London, England.

2,295,660. **Raising the Softening Point of Artificial Threads Spun from Polyvinyl Chloride.** E. Hubert, Dessau-Ziebigk, H. Rein, Leipzig, and K. Rössler, Berlin-Karlshorst, all in Germany; vested in the Alien Property Custodian.

2,295,753. **Antioxidant—a Thermal Reaction Product of a C-Alkenyloxy Substituted Diphenylamine Produced by Pyrolysis at a Temperature between 150 and 300° C.** P. T. Paul, Naugatuck, Conn., assignor to United States Rubber Co., New York, N. Y.

2,295,866. **Rubber Cement Having a Continuous Phase of Rubber Swollen by Solvent, Comprising Rubber Latex and a Petroleum Rubber Solvent Which Contains 2-5% of Rosin.** L. A. Riefenstahl, Wabash, Ind., assignor to General Tire & Rubber Co., Akron, O.

2,295,985. **Rubber Antioxidants — Bis-(2-Hydroxy-3:5-Dimethylphenyl) Alkyl Methane in Which the Alkyl Radical Has not More than Six Carbon Atoms.** W. Baird and M. Jones, both of Blackley, Manchester, England, assignors to Imperial Chemical Industries, Ltd., a corporation of Great Britain.

2,296,275. **Reclaiming Vulcanized Rubber by Introducing Vulcanized Scrap Rubber into a Liquid Bath of Bituminous Material, Heating to a Temperature of about 180° to 225° C. for about 30 to 60 minutes, whereby Depolymerization Is Produced without Any Substantial Swelling or Dissolving of the Rubber.** H. and O. Ghez, both of Paris, France, assignors to "Sudamericana de Patentes" SA, Panama City, Panama.

2,296,331. **Halogen-Containing High-Molecular Weight, Organic Compounds Having Incorporated as a Softener therein a Tertiary Amine Containing at Least One—CH_2COO.Alkyl Radical Attached to the Tertiary Nitrogen Atom.** M. Bögemann, Cologne-Mulheim, and J. Nelles, Leverkusen-Schlebusch, both in Germany, assignors, by mesne assignments, to General Aniline & Film Corp., New York, N. Y.

2,296,363. **Rubber Deterioration Retarder Consisting of an Alkenyl Substituted Phenol.** W. E. Messer, Cheshire, Conn., assignor, by mesne assignments, to United States Rubber Co., New York, N. Y.

2,296,399. **Method for Polymerizing Isobutylene to Viscous Polymers of Increased Stability.** M. Otto, Ludwigshafen-on-the-Rhine, Germany, and H. G. Schneider, Roselle, N. J., assignors, by mesne assignments, to Jasco, Inc., a corporation of La.

2,296,427. **Aqueous Dispersions of Polyisobutylene.** W. Daniel and M. Otto, both of Ludwigshafen-on-the-Rhine, Germany, assignors, by mesne assignments, to Jasco, Inc., a corporation of La.

2,296,464. **Making a Rubber Substitute by Treating Defatted Soya Bean Meal with a Solution of Calcium Hydroxide, Separating the Solution of Proteins So Obtained, Adding Formaldehyde, Bubbling Chlorine through the Solution, Allowing It to Stand for Several Days, Adding about 4-8% of Carbon Disulphide, Again Bubbling Chlorine through, and Subsequently Drying the Solution.** R. Brown, New York, N. Y.

2,296,826. **Process for Releasing the Highly Soluble Rubber Contained within the Cells of Crude Rubber.** M. W. Ditto and W. P. Torrinton, assignors to Emulsions Process Corp., all of New York, N. Y.

2,296,911. **Nitroglycerin Resistant Plastic Container Consisting Principally of a Copolymer of a Vinyl Halide and a Vinyl Ester of a Fatty Acid.** J. M. De Bell, Longmeadow, Mass., assignor to Monsanto Chemical Co., St. Louis, Mo.

2,297,194. **Ozone Resistant Cable Insulation Comprising a Body of Mixed Polymerizates of Butadienes and Acrylic Acid Nitrile Synthetic Rubber Compound, Mechanically and Intimately Mixed with 10-50% by Weight of Polyvinyl Chloride as a Filler.** E. Badum, Bergisch-Gladbach, Germany; vested in the Alien Property Custodian.

2,297,248. **Porous Body Suitable for Use as a Filter or Diaphragm, Consisting of Self-Bonded Particles of Thermoplastic Artificial Resins (Acrylic or Vinyl Resins), Parts of the Particle Surfaces Being Joined with Interstices therebetween.** H. Rudolph, Bietigheim-on-the-Elbe, Wurtemberg, Germany; vested in the Alien Property Custodian.

2,297,290. **Synthetic Rubber Composition Comprising (1) a Compound of the Class Consisting of Polyvinyl Halides and Polyvinylidene Halides, and (2) an Itaconic Diester of a Carbocyclic-Substituted Saturated Aliphatic Monohydric Alcohol.** G. F. D'Alelio, Pittsfield, Mass., assignor to General Electric Co., a corporation of N. Y.

2,297,351. **Method of Preparing a Clear Solid Synthetic Resin Body, Insoluble in Alkali and Common Organic Solvents for Resins, Comprising Polymerizing a Mixture of Dicarboxylic Acids and Olefinic Compounds.** H. L. Gerhart, Milwaukee, Wis., assignor to Pittsburgh Plate Glass Co., Allegheny County, Pa.

2,297,651. **Chewing Gum Base Comprising Latex Coagulum, (from *Asclepias syriaca, Asclepias sullivanti, Asclepias tuberosa, Asclepias subulata,* or *Asclepias erosa*), Water Content not Exceeding 50% and Lacking Chlorophyl and Stickiness.** C. E. Hartwig, Teaneck, N. J., and B. N. Lougovoy, Jackson Heights, N. Y., assignors to American Chicle Co., Long Island City, N. Y.

Dominion of Canada

407,106. **4-Methallyloxy Diarylamine.** Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of P. T. Paul, Naugatuck, Conn., U. S. A.

407,108. **Rubber Composition Which Tends to Deteriorate by Adsorption of Oxygen from the Air, Containing an Alkenyl Substituted Phenol.** Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of W. E. Messer, Cheshire, Conn., U. S. A.

407,109. **Rubber Composition Containing as Deterioration Retarder an N-beta-Benzoyl-Ethyl Dimethylamine.** Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of C. Coleman, Montclair, N. J., U. S. A.

407,110. **Rubber Composition Containing as Antioxidant an N-beta-Propylol-2, 5-Dialkyl Pyrrol.** Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of C. Coleman, Montclair, N. J., U. S. A.

407,111. **Vulcanization Product of Rubber Containing as Antioxidant a Di-(2, 5-Dialkyl-Pyrryl)-Alkane in Which the Alkane Group Contains a Plurality of Carbon Atoms, the Terminal Carbon Atoms Being Respectively Joined to the Nitrogen of the Pyrryl Group.** Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of C. Coleman, Montclair, N. J., U. S. A.

407,112. **Process of Accelerating the Vulcanization of Rubber Which Comprises Vulcanizing It in the Presence of an Alkyl N-Substituted Thiocarbamyl Sulphamine Wherein the Amine Group Attached to Sulphur Is a Primary Amine Group.** Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of R. S. Hanslick, Nashville, Tenn., U. S. A.

407,113. **Preserving Rubber by Incorporating therein a Thermal Reaction Product of 4-Allyloxy Diphenylamine, the Thermal Product Being Produced by Pyrolysis at a Temperature between 150° and 300° C.** Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of P. T. Paul, Naugatuck, Conn., U. S. A.

407,114. **Preserving Rubber by Incorporating therein a 4-Phenylamino 1-Alkyl 1, 2-Dihydrobenzofurane.** Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of P. T. Paul, Naugatuck, and L. H. Howland, Cheshire, co-inventors, both in Conn., U. S. A.

407,132. **Transparent Adhesive Sheet Comprising a Flexible Transparent Backing and a Transparent Adhesive Coating Containing as Ingredients a Rubber-Like Isobutylene Resin, Rubber Latex Crepe, and a Compatible Tack-Producing Resin.** Minnesota Mining & Mfg. Co., assignee of H. J. Tierney, both of St. Paul, Minn., U. S. A.

407,134 and 407,135. **Flexible Adhesive Tape Having a Stretchable Creped Porous Paper Backing Impregnated with a Cohesive Composition Composed of the *in Situ* Vulcanized Fluxed Blend of Broken-down Rubber, Admixed Compatible Resin Adapted to Increase the Cementing Action upon the Fibers of the Paper, a Reenforcing Pigment, and a Self-Vulcanizing Organic Accelerator.** Minnesota Mining & Mfg. Co., assignee of W. Kellgren, both of St. Paul, Minn., U. S. A.

407,258. **High Dielectric Strength Flexible Insulating Material for Electric Cables Comprising an Extrudable Composition Consisting of a Vulcanizing Agent, Rubber, and the Reaction Product of Rubber and Chlorostannic Acid, and Capable of Extrusion in the Form of a Continuous, Thin-Walled, Non-Crepey Covering upon a Wire and Having Sufficient Rigidity That the Wire Will Remain Centered prior to and during Vulcanization of the Composition on the Wire.** Canadian General Electric Co., Ltd., Toronto, Ont., assignee of M. H. Savage, Forest Hills, L. I., N. Y., and L. H. Hitchcock, Milford, Conn., both in the U. S. A.

407,272. **Water Vapor-Proof Structure Comprising a Sheet of Porous and Fibrous Material Firmly Bonded to an Unbroken Film of Vinyl Resin (Conjoint Polymerization Product of Vinyl Chloride with Vinyl Acetate) and Having thereon a Very Thin Coating of Paraffin Wax Melting about 65° C.** Carbide & Carbon Chemicals, Ltd., Toronto, Ont., assignee of F. W. Duggan and F. Groff, co-inventors, both of Lakewood, O., U. S. A.

407,425. **Vulcanization Accelerator Comprising an Alkyl-Substituted 2-Thion Indoline Compound.** Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of L. H. Howland, Nutley, N. J., U. S. A.

407,426. **Vulcanization Accelerator Comprising an N-Alkyl Benzothiazyl Sulphamine.** Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of W. E. Messer, Cheshire, Conn., U. S. A.

407,427. **Vulcanization of Rubber in the Presence of the Reaction Product of a Salt of Mercapto-Aryl-Thiazole and Monochloramine.** Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of R. S. Hanslick, Nashville, Tenn., U. S. A.

407,428. **Styrene Preservation Which Comprises Dissolving Sulphur in a Mixture Consisting of Ethyl Benzene and Styrene and Then Fractionally Distilling the Solution to Recover Styrene as Distillate in Readily Polymerizable Form.** Dow Chemical Co., assignee of J. W. Britton, R. F. Prescott, and R. C. Dosser, co-inventors, all of Midland, Mich., U. S. A.

407,463. **Producing Composite Articles of a Rubber and a Metal by Applying between the Surfaces a Plurality of Layers of Hydrocarbon Rubber Derivatives Prepared by Forming an Intimate Mixture of Solid Rubber, a Weak Acid Substance, and a Solid Salt of a Strong Acid.** R. J. Reaney, assignee of T. R. Griffith, both of Ottawa, Ont.

407,494. **Producing Non-Blooming Vulcanized Rubber Stock by Blending Water Gas Tar Pitch with Rubber in Such Amount That the Rubber Predominates over the Pitch.** Allied Chemical & Dye Corp., assignee of Barrett Co., both of New York, N. Y., assignee of T. A. Bulifant, Hackensack, N. J., both in the U. S. A.

United Kingdom

546,709. **Manufacture of Butadiene.** A. L. Mond (Universal Oil Products Co.).

546,797. **Treatment of Rubber.** Hercules Powder Co.

546,960. **Accelerators of Vulcanization.** United States Rubber Co.

547,067. **Alpha Halo Acrylo Nitriles.** Wingfoot Corp.

547,271. **Rubber Hydrochloride Film.** Wingfoot Corp.

(*Continued on page* 216)

Market Reviews

RUBBER SCRAP

THERE continues to be a fairly steady movement of scrap rubber into dealers' hands although it is much less than the desired rate.

The demand for scrap rubber is expected to increase in proportion to the production of the all-reclaim civilian tire with the possible exception of a period during which the reclaimers use scrap already on hand while adjusting themselves to operation under the new increased ceiling prices for several classifications of scrap rubber announced October 26 by OPA. These new prices, in Amendment 3 to Revised Price Schedule 87 as Amended, and effective October 31, apply only to sales made by the Rubber Reserve Co., since that organization was made sole seller of scrap rubber to processors by the WPB. Several months ago Rubber Reserve offered to buy tires and miscellaneous scrap in carload lots at $25 a ton. After paying this inducement price and bearing the freight cost to consuming centers, Rubber Reserve has been faced with a sizable deficit in its sales to consumers at the former OPA ceilings.

Ceilings are raised by this new amendment on scrap tires, tire parts, and black truck tubes. The ceiling on whole tires is increased from $18 to $30 a ton at Akron and by corresponding amounts at other consuming centers. No. 1 peelings may be sold at $75 a ton instead of the $47.50 price permitted previously at all centers except Los Angeles, where ceilings on scrap are generally lower.

Another change in the scrap rubber price regulation is a reduction in the number of classifications for which price ceilings are established. This is done by grouping former separate classifications. For instance, mixed passenger tires and mixed truck tires are now included in the same classification and are under the same price ceiling.

Maximum Prices at Consuming Centers*

	¢ per lb.
Inner Tubes†	
No. 2 passenger tubes	7¾
Red passenger tubes	7½
Passenger tubes	6
Tires‡	$ per Short Ton
Mixed passenger tires	30.00
Beadless passenger tires	38.00
Solid tires	34.00
Peelings†	
No. 1 peelings	75.00
No. 2 peelings	47.50
No. 1 light colored (zinc) carcass	82.50
Miscellaneous Items≠	
Air brake hose	25.00
Miscellaneous hose	17.00
Rubber boots and shoes	33.00
Black mechanical scrap above 1.15 sp. gr.	20.00
General household and industrial scrap	15.00

* For a complete list of revised ceiling prices see our next issue.
† All consuming centers except Los Angeles.
‡ Akron only.
≠ All consuming centers.

Fixed Government Prices*

Plantation Grades

	Price per Lb.
No. 1-X R.S.S. in cases	$0.22½
No. 1 Thin Latex Crepe	.23 5/16
No. 2 Thick Latex Crepe	.23 5/16
No. 1 Brown Crepe	.21 3/8
No. 2 Brown Crepe	.21 5/16
No. 2 Amber	.21 3/8
No. 3 Amber	.21 5/16
Rolled Brown	.17 1/2

*For a complete list of government prices see our June, 1942, issue, p. 254.

New York Market Rubber Quotations

	Sept. 25, 1941	Aug. 26, 1942	Sept. 28, 1942
	(Dollars and Cents)		
Latex			
Normal and concentrated (solid content) *lb.*	.2755/.29	.2825/.29	.2825/.29
Paras †			
Upriver fine *lb.*	.29	.....	.....
Upriver fine *lb.*	*.31½	.....	.....
Upriver coarse *lb.*	.15	.....	.....
Upriver coarse *lb.*	*.22	.....	.....
Islands fine *lb.*	.28	.....	.....
Islands fine *lb.*	*.30	.....	.....
Acre, Bolivian fine *lb.*	.29½	.....	.....
Acre, Bolivian fine *lb.*	*.32	.....	.....
Beni, Bolivian fine *lb.*	.30½	.....	.....
Maderia fine *lb.*	.29	.....	.....
Caucho †			
Upper ball *lb.*	.15	.....	.....
Upper ball *lb.*	*.22	.....	.....
Lower ball *lb.*	.14	.....	.....
Pontianak			
Pressed block *lb.*	.22/.29	‡	‡
Guayule			
Ampar *lb.*	.16½	.....	.....
Africans			
Rio Nunez *lb.*	.18	.225	.225
Black Kassai *lb.*	.18	.225	.225
Prime Niger flake *lb.*	.28	.35	.35
Gutta Percha			
Gutta Siak *lb.*	.25	‡	‡
Gutta Soh *lb.*	.29	‡	‡
Red Macassar *lb.*	1.35	3.00	3.00
Balata			
Block Ciudad Bolivar *lb.*	.47	‡	‡
Manaos block *lb.*	.47	‡	‡
Surinam sheets *lb.*	.50	‡	‡
Amber *lb.*	.52	‡	‡

*Washed and dried crepe. Shipments from Brazil.
†These Brazilian rubbers have been taken over by the Rubber Reserve Co., and no prices have as yet been set.
‡None available at present.

RECLAIMED RUBBER

AN INCREASED demand has made itself evident during the past month in anticipation of probable increased consumption that will be experienced when official approval is given and the details are worked out for the production and distribution of the all-reclaim "War" or "Victory" tires. As soon as any appreciable volume is reached in the production of synthetic rubber from the government-owned plants, a further increase in the demand for reclaim should result because of the demonstrated ability of reclaim to aid in the processing of certain types of synthetic rubbers and the obvious value of the reclaim in making the available synthetic rubber go farther in the manufacture of finished goods.

Reclaimers have received substantial quantities of raw material, but which contains large amounts of low-grade household scrap, etc. An outlet is being found in the production of reclaim for the manufacture of non-essential civilian items, and further developments in expanding this field are to be expected.

Ceiling prices for reclaimed rubber follow.

New York Quotations

	Sp. Grav.	¢ per lb.
Auto Tire		
Black Select	1.16-1.18	6½/ 6¾
Acid	1.18-1.22	7½/ 7¾
Shoe		
Standard	1.56-1.60	7 / 7¼
Tubes		
Black	1.14-1.26	11¼/11½
Gray	1.15-1.26	12½/13¼
Red	1.15-1.32	12 /12¼
Miscellaneous		
Mechanical blends	1.25-1.50	4½/ 5½
White	1.35-1.50	13½/14½

The above list includes those items or classes only that determine the price bases of all derivative reclaim grades. Every manufacturer produces a variety of special reclaims in each general group separately featuring characteristic properties of quality, workability, and gravity at special prices.

Rims Approved and Branded by The Tire & Rim Association

Rim Size	Oct. 1942
15″ & 16″ D. C. Passenger	
16x4.00E	1,979
16x4.50E	4,338
16x5.00F	3,629
15x5.50F	1,511
17″ & over D. C. Passenger	
18x2.15B	6,305
Military	
16x4.50CE	73,412
16x6.50CS	67,662
20x4.50CR	16,255
20x6.00CT	6,136*
20x10.00CW	124
Flat Base Truck	
20x4.33R (6″)	33,852
24x4.33R (6″)	1,425
15x5.00S (7″)	8,996
20x5.00S (7″)	319,965
24x5.00S (7″)	1,013
15x6.00T (8″)	6,594
18x6.00T (8″)	4,182
20x6.00T (8″)	31,910
22x6.00T (8″)	13,970
24x6.00T (8″)	588
18x7.33V (9/10″)	190
20x7.33V (9/10″)	15,193
22x7.33V (9/10″)	240
24x7.33V (9/10″)	3,883
19x8.37V (11″)	158
20x8.37V (11″)	2,532
24x8.37V (11″)	1,285
Semi D. C. Truck	
16x4.50E	2,262
Tractor & Implement	
24x8.00T	3,461
Cast	
24x11.25	13
24x13.00	62
24x15.00	84
TOTAL	633,209

*3,456 too many of this rim reported for July, 1942.

COMPOUNDING INGREDIENTS

A FEW more OPA and WPB orders have been issued which involve rubber compounding materials. Prices on all commodities are substantially unchanged.

CARBON BLACK. Demand is increasing and exceeding supply. One manufacturer is expanding facilities, but does not anticipate much relief in the supply situation because of the constantly increasing production of synthetic rubber. Shipments of carbon black for September were reported to be 25,378,000 pounds, as compared with 24,016,000 pounds for August, with shipments of gas black also slightly larger.

General Preference Order M-244, issued October 16 and effective November 1, places furnace carbon black under complete allocation control because of the shortage created in this type of black by the fulfillment of requirements for defense purposes.

RUBBER SOLVENTS. Supply of benzol remains tight, with very little available for non-essential purposes and large quantities continuing to move to synthetic rubber production.

Amendments 2 to Maximum Price Regulation No. 36 (Acetone) and No. 37 (Butyl Alcohol and Esters thereof), issued and effective October 3, establishes ceiling prices for normal fermentation butyl alcohol and for fermentation acetone. The adjusted prices for these two products will enable manufacturers to obtain a yield high enough to provide the necessary production of these chemicals. The joint product nature of butyl alcohol and acetone obtained from grain fermentation means that a decrease in the market price for one has the effect of increasing production cost of the other. Because of the recent decline in acetone prices, established ceilings of 8½¢ per pound for acetone and 12½¢ for butyl alcohol did not allow producers sufficient adequate net return on both products.

RUBBER SUBSTITUTES OR FACTICE. Demand for factice and rubber substitutes is growing as the war effort increases. Factice made from imported oils can only be used with rubber or synthetic rubber, but the grades made from domestic oils are finding favor in compounds replacing rubber in larger amounts. In some instances where tensile strength or resistance to abrasion is not of great importance these substitutes have replaced rubber completely.

General Preference M-10, which controls the allocation of polyvinyl chloride, was amended October 10 to cover all vinyl polymers and includes even vinyl polymer scrap regardless of the source from which it was derived. Some of the vinyl polymers are known by the trade names Koroseal, Vinylite V, Saran, Butvar, Formvar, Alvar, Butacite, Haydenite, Saflex, Vinylite X, Vinylite A, PVA, Gelva, and Solva. The order defines "vinyl polymers" as plasticized or unplasticized polymers and copolymers of vinyl acetate, vinyl chloride, and polyvinyl alcohol and includes their condensation products. Such term also includes, but is not limited to, vinyl chloride-acetate copolymers, polyvinyl butyral, polyvinyl formal, and polyvinyl acetal and the materials known by the trade names mentioned above. Order M-10 obviates the need of Supplementary Order M-154-a which placed polyvinyl butyral under allocation control and was therefore revoked on October 12. Monomer vinyl acetate, used in the manufacture of rubber substitutes, was placed under allocation control by General Preference Order M-240, issued and effective October 8.

ZINC OXIDE. September and October are reported to have been better than any of the preceding six months as rubber companies worked off inventories of zinc oxide that appeared to have been excessive under current conditions. Prices are unchanged.

Current Quotations*

Abrasives

Pumicestone, powdered	lb.	$0.035	/$0.04
Rottenstone, domestic	lb.	.025	

Accelerators, Inorganic

Lime, hydrated, *l.c.l.*, New York	ton	25.00	
Litharge (commercial)	lb.	.09	
Magnesia, calcined, heavy	lb.		
technical, light	lb.	.0625 /	.07

Accelerators, Organic

A-1	lb.	.28 /	.33
A-10	lb.	.36 /	.42
A-19	lb.	.52 /	.65
A-32	lb.	.60 /	.70
A-46	lb.	.50 /	.57
A-77	lb.	.42 /	.55
A-100	lb.	.42 /	.55
Accelerator 49	lb.	.40 /	.42
808	lb.	.59 /	.61
833	lb.	1.13	1.15
Acrin	lb.	.65	
Aldehyde ammonia	lb.	.65 /	.70
Altax	lb.	.43 /	.45
Arazate	lb.	1.53	
B-J-F	lb.	.38 /	.43
Beutene	lb.	.59 /	.64
Butasan	lb.	1.15	
Butazate	lb.	1.13	
Butyl Eight	lb.	.97 /	.99
C-P-B	lb.	1.95	
Captax	lb.	.38 /	.40
D-B-A	lb.	1.95	
Delac A	lb.	.39 /	.48
O	lb.	.39 /	.48
P	lb.	.39 /	.48
Di-Esterex-N	lb.	.50 /	.57
DOTG (Di-ortho-tolyguanidine)	lb.	.44 /	.46
DPG (Diphenylguanidine)	lb.	.35 /	.36
El-Sixty	lb.	.40 /	.47
Ethasan	lb.	1.13	
Ethazate	lb.	1.13	
Ethylideneaniline	lb.	.42 /	.43
Formaldehyde P.A.C.	lb.	.06 /	.0625
Formaldehyde-para-toluidine	lb.	.63 /	.65
Formaniline	lb.	.36 /	.37
Guantal	lb.	.39 /	.48
Hepteen	lb.	.34 /	.39
Base	lb.	1.25 /	1.40
Hexamethylenetetramine U.S.P.	lb.	.39	
Technical	lb.	.33	
Lead oleate, No. 999	lb.	.175	
Witco	lb.	.15	
Ledate	lb.	1.48	
M-B-T	lb.	.38 /	.40
M-B-T-S	lb.	.43 /	.45
Methasan	lb.	1.23	
Methazate	lb.	1.23	
Monex	lb.	1.53	
Morfex "33"	lb.	.67 /	.72
"55"	lb.	.96 /	1.01
O-X-A-F	lb.	.38 /	.43
Oxynone	lb.	.77 /	.90
Para-nitroso-dimethylaniline	lb.	.85	
Pentex	lb.	.74 /	.84
Flour	lb.	.1225 /	.1325
O	lb.		
Flour	lb.		
Phenex	lb.	.49 /	.54
Pipazate	lb.	1.53	
Pip-Pip	lb.	1.63	
R & H 50-D	lb.	.42 /	.43
Rotax	lb.	.48 /	.50
Safex	lb.	1.15 /	1.25
Santocure	lb.	.60 /	.67
Selenac	lb.	1.98	
SPDX	lb.	.69 /	.74
A	lb.	.69 /	.74
Super sulphur No. 2	lb.	$0.13	/$0.15
Tetrone A	lb.	2.20	
Thiocarbanilide	lb.	.28 /	.33
Thiofide	lb.	.43 /	.50
Thionex	lb.	1.53	
Thiotax	lb.	.38 /	.45
Thiurad	lb.	1.53	
Trimene	lb.	.54 /	.64
Base	lb.	1.03 /	1.18
Triphenylguanidine (TPG)	lb.	.45	
Tuads, Methyl	lb.	1.53	
2-MT	lb.	.58 /	.60
Ulto	lb.	.99 /	1.04
Ureka	lb.	.50 /	.57
Blend B	lb.	.50 /	.57
C	lb.	.48 /	.55
Vulcanex	lb.	.42 /	.43
Z-B-X	lb.	2.45	
Zenite	lb.	.40 /	.42
A	lb.	.45 /	.47
B	lb.	.42 /	.44
Zimate, Butyl	lb.	1.13	
Ethyl	lb.	1.13	
Methyl	lb.	1.23	
Zipacel	lb.	1.65	

Activators

Aero Ac 50	lb.	.46 /	.52
Barak	lb.	.50	
MODX	lb.	.295 /	.345
SL No. 20	lb.	.1089 /	.1135

Age Resisters

AgeRite Alba	lb.	1.95 /	2.05
Gel	lb.	.56 /	.58
Hipar	lb.	.64 /	.66
Powder	lb.	.48 /	.50
Resin	lb.	.48 /	.50
D	lb.	.48 /	.50
White	lb.	1.23 /	1.33
Albasan	lb.	.69 /	.74
Aminox	lb.	.48 /	.57
Antox	lb.	.54 /	.56
Betanox	lb.	.48 /	.57
B-L-E	lb.	.48 /	.57
Powder	lb.	.64 /	.73
B-X-A	lb.	.48 /	.57
Copper Inhibitor X-872-A	lb.	1.15	
Flectol H	lb.	.48 /	.55
White	lb.	.89 /	1.00
M-U-F	lb.	1.48	
Neozone (standard)	lb.	.61 /	.63
A	lb.	.48 /	.50
C	lb.	.48 /	.50
D	lb.	.48 /	.50
E	lb.	.61 /	.63
Oxynone	lb.	.77 /	.90
Permalux	lb.	1.18 /	1.20
Santoflex B	lb.	.48 /	.55
BX	lb.	.57 /	.64
Santovar A	lb.	1.15 /	1.40
Stabilite	lb.	.48 /	.69
Alba	lb.	.50 /	.74
Thermoflex A	lb.	.64 /	.66
C	lb.	.57 /	.59
Tysonite	lb.	.16 /	.165
V-G-B	lb.	.48 /	.57

Alkalies

Caustic soda, flake, Columbia (400-*lb. drums*)	100 lbs.	2.70 /	3.55
liquid, 50%	100 lbs.	1.95	
solid (700-*lb. drums*)	100 lbs.	2.30 /	3.15

Antiscorch Materials

Antiscorch T	lb.	.90	
Cumar RH	lb.	.105	
E-S-E-N	lb.	.34 /	.39
R-17 Resin (*drums*)	lb.	.1075	
RM	lb.	1.25	
Retarder W	lb.	.36	
Retardex	lb.	.445 /	.475
U-T-B	lb.	.34 /	.39

Antisun Materials

Heliozone	lb.	.23 /	.24
S.C.R.	lb.	.32 /	.34
Sunproof	lb.	.2275 /	.2775
Jr.	lb.	.165 /	.215

Blowing Agents

Ammonium Carbonate, lumps (500-*lb. drums*)	lb.	.0825	
Unicel	lb.	.50	

Brake Lining Saturant

B.R.T. No. 3	lb.	.0175 /	.0185

Colors

Black			
Du Pont powder	lb.	.42	
Lampblack (commercial), *l.c.l.*	lb.	.15	
Blue			
Du Pont Dispersed	lb.	.35 /	.95
Powders	lb.	2.25 /	3.75
Heliogen BKA	lb.		
Toners	lb.		
Brown			
Mapico	lb.	.1135	
Green			
Chrome	lb.	.25	
oxide (*freight allowed*)	lb.	.24	
Du Pont Dispersed	lb.	.98 /	2.85
Powders	lb.	1.00	
Guignet's (*bbls.*)	lb.	.70	
Toners	lb.		

*Prices in general are f.o.b. works. Range indicates grade or quantity variations. Space limitation prevents listing of all known ingredients. Prices are not guaranteed, and those readers interested should contact suppliers for spot prices

Orange
- Du Pont Dispersed ..... lb. $0.88 /$2.35
- Powders ..... lb. 2.75 / 3.05
- Toners ..... lb.

Orchid
- Toners ..... lb.

Pink
- Toners ..... lb.

Purple
- Toners ..... lb.

Red
- Antimony
  - Crimson, 15/17% ..... lb.
  - R. M. P. No. 3 ..... lb. .48
  - Sulphur free ..... lb.
  - R.M.P. ..... lb. .52
  - Golden 15/17% ..... lb.
  - 7-A ..... lb. .37
  - Z-2 ..... lb. .25
- Cadmium, light (400-*lb. bbls.*) ..... lb. .80 / .85
- Du Pont Dispersed ..... lb. .93 / 2.05
- Powders ..... lb. .60 / 1.65
- Iron Oxide, *l.c.l.* ..... lb. .045 / .15
- Mapico ..... lb. .096
- Rub-Er-Red (*bbls.*) ..... lb. .0975
- Toners ..... lb.

White
- Lithopone (*bags*) ..... lb. .0425/ .045
- Albalith ..... lb. .0425/ .045
- Astrolith (50-*lb. bags*) ..... lb. .0425/ .045
- Azolith ..... lb. .0425/ .045
- Titanium Pigments
  - Ray-bar ..... lb. .055 / .065
  - Ray-cal ..... lb. .0525/ .0625
  - Rayox ..... lb. .135 / .165
  - Titanolith (50-*lb. bags*) ..... lb. .056 / .0585
  - Titanox-A ..... lb. .145 / .175
  - B ..... lb. .0575/ .0625
  - 30 ..... lb. .0575/ .0625
  - C ..... lb. .055 / .06
  - M ..... lb. .0575/ .0625
  - RC ..... lb. .055 / .06
  - RC-HT ..... lb. .055 / .06
  - Ti-Tone ..... lb.
  - Zopaque (50-*lb. bags*) ..... lb. .145 / .1525
- Zinc Oxide
  - Azo ZZZ-11 ..... lb. .0725/ .075
  - 44 ..... lb. .0725/ .075
  - 55 ..... lb. .0725/ .075
  - 66 ..... lb. .095 / .0975
  - French Process, Florence
    - Green Seal-8 ..... lb. .09 / .0925
    - Red Seal-9 ..... lb. .085 / .0875
    - White Seal-7 ..... lb. .095 / .0975
  - Kadox, Black Label-15 ..... lb. .0725/ .075
  - No. 25 ..... lb. .085 / .0875
  - 72 ..... lb. .0725/ .075
  - Red Label-17 ..... lb. .0725/ .075
  - Horse Head Special 3 ..... lb. .0725/ .075
  - XX Red-4 ..... lb. .0725/ .075
  - 23 ..... lb. .0725/ .075
  - 72 ..... lb. .0725/ .075
  - 78 ..... lb. .0725/ .075
  - 80 ..... lb. .0725/ .075
  - 103 ..... lb. .0725/ .075
  - 110 ..... lb. .0725/ .075
  - St. Joe (lead free)
    - Black Label ..... lb. .0725/ .075
    - Green Label ..... lb. .0725/ .075
    - Red Label ..... lb. .0725/ .075
  - U.S.P. ..... lb. .105 / .1075
- Zinc Sulphide Pigments
  - Cryptone-BA-19 ..... lb. .056 / .0585
  - BT ..... lb. .056 / .0585
  - CB ..... lb. .056 / .0585
  - MS ..... lb. .0575/ .06
  - ZS No. 20 ..... lb. .0825/ .085
  - 86 ..... lb. .0825/ .085
  - 230 ..... lb. .0825/ .085
  - 800 ..... lb. .0825/ .085
  - Sunolith ..... lb. .0425/ .045

Yellow
- Cadmolith (cadmium yellow), (400-*lb. bbls.*) ..... lb. .55 / .60
- Du Pont Dispersed ..... lb. 1.25 / 1.85
- Powders ..... lb. .70 / 1.75
- Mapico ..... lb. .071
- Toners ..... lb.

Dispersing Agents
- Bardex ..... lb. .0425/ .045
- Bardol ..... lb. .025 / .0275
- B ..... lb. .05 / .0525
- Darvan No. 1 ..... lb. .30 / .34
- No. 2 ..... lb. .30 / .34
- No. 3 ..... lb. .30 / .34
- Nevoil (*drums, c.l.*) ..... .0225
- Santomerse S ..... lb. .11 / .25

Extenders
- Extendex C ..... lb.
- Naftolen ..... lb. .15 / .20
- "600" S ..... lb. .14 / .16
- Vanzak ..... gal. .05 / .06

Fillers, Inert
- Asbestine, *c.l.* ..... ton 20.00
- Asbestos Fiber ..... ton 15.50 / 48.00
- Barytes ..... ton 40.00
- f.o.b., St. Louis (50-*lb. paper bags*) ..... ton 25.55
- off color, domestic ..... ton 29.00
- white, domestic ..... ton 38.50
- Blanc fixe, dry, precip ..... ton 80.00
- Calcene ..... ton 37.50 /43.00
- Infusorial earth ..... lb. .0225
- Kalite No. 1 ..... ton $26.00
- 3 ..... ton 36.00
- Kalvan ..... ton 100.00
- Magnesium Carbonate, *l.c.l.* ..... lb. $0.0725
- Paradene No. 2 (*drums*) ..... lb. .0525
- Pyrax A ..... ton 7.50
- Whiting
  - Columbia Filler ..... ton 9.00 /$14.00
  - Suprex White ..... ton 32.50
  - Witco, *c.l.* ..... ton 8.00
- Witcarb ..... lb.

Finishes
- Black-Out (surface protective) ..... gal. 4.50 / 5.00
- Mica, *l.c.l.* ..... ton 20.00 /100.00
- Rubber lacquer, clear ..... gal. 1.00 / 2.00
- colored ..... gal. 2.00 / 3.50
- Shoe varnish ..... gal. 1.45
- Talc ..... ton 25.00

Flock
- Cotton flock, dark ..... lb. .085 / .11
- dyed ..... lb. .45 / .80
- white ..... lb. .12 / .19
- Rayon flock, colored ..... lb. .85 / 1.25
- white ..... lb. .75 / 1.00

Latex Compounding Ingredients
- Accelerator 552 ..... lb. 1.63
- Aerosol OT Aqueous 10% ..... lb. .125
- Antox, dispersed ..... lb. .54
- Aquarex D ..... lb. .75
- F ..... lb. .85
- MDL Paste ..... lb. .25
- Areskap No. 50 ..... lb. .18 / 0.24
- 100, dry ..... lb. .39 / .51
- Aresket No. 240 ..... lb. .16 / .22
- 300, dry ..... lb. .42 / .50
- Aresklene No. 375 ..... lb. .35 / .50
- 400 dry ..... lb. .51 / .65
- Black No. 25, dispersed ..... lb. .22 / .40
- Casein, muriatic 30 mesh ..... lb. .19
- Collocarb ..... lb. .07
- Color Pastes, dispersed ..... lb. .75 / 1.10
- Copper Inhibitor X-872 ..... lb. 2.25
- Dispersex No. 15 ..... lb. .11 / .12
- No. 20 ..... lb. .08 / .10
- Factex Dispersion A ..... lb. .17
- Heliozone, dispersed ..... lb. .25
- MICRONEX, Colloidal ..... lb. .06
- R-2 Crystals ..... lb. 1.55
- S-1 (400-*lb. drums*) ..... lb. .65
- Santobrite Briquettes ..... lb.
- Powder ..... lb.
- Santomerse D ..... lb. .41 / .65
- S ..... lb. .11 / .25
- Sodium Stearate ..... lb. .40
- Stablex A ..... lb. .90 / 1.10
- B ..... lb. .70 / .95
- C ..... lb. .40 / .50
- Sulphur, dispersed ..... lb. .10 / .15
- No. 2 ..... lb. .08 / .12
- T-1 (440-*lb. drums*) ..... lb. .40
- Tepidone ..... lb. .63
- Tetrone A ..... lb. 2.20
- Tysonite, dispersed ..... lb. .32 / .35
- Zenite Special ..... lb. .47
- Zinc oxide, dispersed ..... lb. .12 / .15

Mineral Rubber
- Black Diamond, *l.c.l.* ..... ton 25.00 /30.00
- B.R.C. No. 20 ..... lb. .0105/ .0115
- Hydrocarbon, Hard ..... lb. 25.00 /27.00
- MilliMar ..... lb. .055
- Parmr ..... ton
- Pioneer, *c.l.* ..... lb. 25.00 /27.00
- 285°-300° ..... ton 25.00 /27.00

Mold Lubricants
- Aluminum Stearate ..... lb. .21 / .24
- Aquarex D ..... lb. .75
- MDL Paste ..... lb. .25
- Colite ..... gal. .90 / 1.15
- Lubrex ..... lb. .25 / .30
- Mold Paste ..... lb. .12 / .30
- Rubber-Glo, conc. regular ..... gal. .94 / 1.15
- Type W ..... gal. .99 / 1.20
- Sericite ..... ton 65.00
- Soapstone, *l.c.l.* ..... ton 22.50
- Zinc Stearate ..... lb. .28 / .31

Oil Resistant
- A-X-F ..... lb. .82 / .85

Reclaiming Oils
- B.R.V. ..... lb. .035 / .0375
- C-10 ..... gal. .19 / .24
- D-4 ..... gal. .17 / .22
- E-5 ..... gal. .15 / .20
- No. 1621 ..... lb. .021 / .0235
- S.R.O. ..... lb. .02 / .0225
- Type C (for synthetic rubber) ..... gal. .33 / .38
- X-443 ..... gal. .29

Reenforcers
- Carbon Black
  - Aerfloted Arrow Specification (*bags only*) ..... lb. .0355†
  - Arrow Compact Granulized ..... lb. .0355†
  - Certified Heavy Compressed (*bags only*) ..... lb. .0355†
  - Spheron ..... lb. .0355†
- Channel "S" ..... lb. .12

†Price quoted is f.o.b. works (bags). The price f.o.b. works (bulk) is $0.033 per pound. All prices are carlot.

- Continental, dustless ..... lb. $0.0355†
- "AA" ..... lb.
- Compressed (*bags only*) ..... lb. .0355†
- Dispersо ..... lb. .0355†
- Dixie ..... lb. .0355†
- Dixiedensed ..... lb. .0355†
- 66 ..... lb. .0355†
- Furnex ..... lb. .035
- Beads ..... lb. .035
- Gastex ..... lb. .035 /$0.06
- HX ..... lb. .0355†
- Kosmobile ..... lb. .0355†
- 66 ..... lb. .0355†
- Kosmos ..... lb. .0355†
- Dixie 20 ..... lb. .035†
- MICRONEX Beads ..... lb. .0355†
- Hi-Tear ..... lb. .0355
- Mark II ..... lb. .0355
- Standard ..... lb. .0355
- W-5 ..... lb. .0355
- W-6 ..... lb. .0355
- P-33 ..... lb. .0475
- Pelletex ..... lb. .035 / .06
- Spheron "C" (bags) ..... lb. .0455†
- Statex ..... lb.
- Thermax ..... lb. .0225
- "S" ..... lb. .0675
- TX ..... lb. .0355†
- Velvetex ..... lb.
- "WYEX BLACK" ..... lb. .0355†
- Carbonex Flakes ..... lb. .03 / .035
- S ..... lb. .031 / .036
- Plastic ..... lb. .031 / .0335
- Clays
  - Aerofloted Hi-White ..... ton 11.00
  - LGB ..... ton 15.00
  - Paragon (50-*lb. bags*) ..... ton 10.00
  - Suprex (50-*lb. bags*) ..... ton 10.00 /23.50
  - Catalpo, *c.l.* ..... ton 30.00
  - China ..... ton 25.00
  - Dixie ..... ton 10.00 /22.50
  - "L" ..... ton 10.00
  - Langford ..... ton 8.50
  - McNamee ..... ton 10.00
  - Par ..... ton 10.00
  - Paraforce, *c.l.* ..... ton 50.00
  - Witco, *c.l.* ..... ton 10.00
- Cumar EX ..... lb. .05
- MH ..... lb. .065 / .115
- V ..... lb. .095 / .125
- 465 Resin ..... lb.
- "G" Resin ..... lb.
- Nevindene ..... lb.
- Silene ..... lb. .04 / .045

Reodorants
- Amora A ..... lb.
- B ..... lb.
- C ..... lb.
- D ..... lb.
- Curodex 19 ..... lb.
- 188 ..... lb.
- 198 ..... lb.
- Rodo No. 0 ..... lb. 4.00 / 4.50
- 10 ..... lb. 5.00 / 5.50

Rubber Substitutes
- Black ..... lb. .085 / .13
- Brown ..... lb. .085 / .1375
- White ..... lb. .09 / .15
- Factice
  - Amberex Type B ..... lb. .1875
  - Brown ..... lb. .085 / .1375
  - Fac-Cel B ..... lb. .15
  - C ..... lb. .15
  - Neophax A ..... lb. .165
  - B ..... lb. .165
  - White ..... lb. .09 / .15

Softeners and Plasticizers
- Ambidex ..... lb.
- B.R.T. No. 7 ..... lb. .02 / .021
- Bondogen ..... lb. .98 / 1.05
- Bunnatol (for synthetic rubber) ..... lb. .40 / .50
- F ..... lb.
- G ..... lb.
- Burgundy pitch ..... lb.
- Copene Resin ..... lb. .32
- Cycline oil ..... gal. .14 / .20
- Dipolymer Oil ..... gal. .33 / .38
- Dispersing Oil No. 10 ..... lb. .0375/ .04
- LX-436 (*tank car*) ..... lb. .027
- Myristilene ..... lb. .20 / .30
- Nevinol ..... lb. .13 / .14
- Nuba resinous pitch (*drums*)
  - Grades No. 1 and No. 2 ..... lb. .029
  - 3-X ..... lb. .0425
- Nypene Resin ..... lb. .32
- Palm oil (Witco), *c.l.* ..... lb.
- Palmalene ..... lb. .15 / .25
- Palmol ..... lb. .16
- Para Flux (reg.) ..... gal. .17 / .18
- No. 2016 ..... gal. .135 / .19
- Para Lube ..... lb. .046 / .048
- Paradene No. 1 (*drums*) ..... lb. .0525
- Special (*drums*)
  - 20 to 35° C. M.P. ..... lb. .0625
  - 35 to 45° C. M.P. ..... lb. .0625
  - 45 to 75° C. M.P. ..... lb. .0575
- Piccocizer "30" ..... lb.
- Piccolyte Resins ..... lb. 15 / .185
- Piccoumaron Resins ..... lb. .045 / .15
- Pictar ..... gal. .18 / .23
- Pine tar ..... gal.
- Oil ..... gal. .40 / .42
- Plastogen ..... lb. .0775/ .08
- Plastone ..... lb. .27 / .30
- R-19 Resin (*drums*) ..... lb. .1075
- 21 Resin (*drums*) ..... lb. .1075

Reogen	lb.	.115 /	.12
RPA No. 1E	lb.	.55	
2	lb.	.65	
3	lb.	.46	
4	lb.	.80	
Tackol	lb.	.085 /	.18
Tarzac	lb.	.23 /	.24
Tonox	lb.	.50 /	.59
Witco No. 20, *l.c.l.*	gal.	.20	
X-1 resinous oil (*tank car*)	lb.	.011	
XX-100 Resin	lb.	.0525	

Softeners for Hard Rubber Compounding

Resin C Pitch 45°C. M.P.	lb.	.015 /	.016
60°C. M.P.	lb.	.015 /	.016
75°C. M.P.	lb.	.015 /	.016

Solvents

Beta-Trichlorethane	lb.	.20	
Carbon Bisulphide	100 lbs.	5.75	
Tetrachloride	gal.	.80	
Cosol No. 1	gal.	.26	
No. 2	gal.	.25	
No. 3	gal.	.22	
Industrial 90% benzol (*tank car*)	gal.	.15	
Picco	gal.	.22 /	.32
Skellysolve	gal.		

Stabilizers for Cure

Barium Stearate	lb.	.29 /	.32
Calcium Stearate	lb.	.26 /	.27
Laurex (*bags*)	lb.	.1475 /	.1725
Lead Stearate	lb.		
Magnesium Stearate	lb.	.29 /	.32
Stearex B	lb.		
Beads	lb.		
Stearic acid, single pressed	lb.		
Stearite, *c.l.*	lb.	.1325	
Zinc Laurate	lb.	.29 /	.32
Stearate	lb.	.29 /	.31

Synthetic Rubber

Neoprene Latex Type 571	lb.	.30	
60	lb.	.36	
Neoprene Type CG	lb.	.70	
E	lb.	.65	
FR	lb.	.75	
G	lb.	.70	
GN	lb.	.65	
ILS	lb.	.70	
KNR	lb.	.75	
M	lb.	.65	
Synthetic 100	lb.	.41	
"Thiokol" Type "A"	lb.	.35	
"FA"	lb.	.50	
"RD"	lb.	.70	

Tackifier

B.R.H. No. 2	lb.	.02 /	.021
LX-433 (*tank car*)	lb.	.068	
P.H.O. (*drums*)	lb.	.24	

Vulcanizing Ingredients

Magnesia, light (for neoprene)	lb.	.25
Sulphur	100 lbs.	2.05
Chloride (*drums*)	lb.	.04
Telloy	lb.	1.75
Vandex	lb.	1.75
(See also Colors—Antimony)		

Waxes

736 (clear)	gal.	1.25
737 (black)	gal.	1.35
1515-A (black)	gal.	1.35
Carnauba, No. 3 chalky	lb.	.78
2 N.C.	lb.	.84
3 N.C.	lb.	.79
1 Yellow	lb.	
2	lb.	
Carnube	lb.	.46 / .56
Monten	lb.	.12 / .17
Rubber Wax No. 118, Neutral	gal.	.76 / 1.31
Colors	gal.	.86 / 1.41

Agreement with Venezuela

The State Department, Rubber Reserve Co., and the Board of Economic Warfare, all of Washington, D. C., last month announced the signing of a rubber agreement with Venezuela whereby all its rubber locally produced and not needed for domestic consumption (about 800 tons) will be purchased by Rubber Reserve. The agreement is renewable yearly until the end of 1946. Rubber Reserve will also provide aid, totaling about $500,000, to assist in rubber production and transport.

MACHINERY

(*Continued from page* 211)

United States

22,192. (Reissue.) **Device to Support Tires in Vulcanizers.** J. H. Zimmerman, Cuyahoga Falls, O., assignor to Wingfoot Corp., Wilmington, Del.

2,295,090. **Mechanism for Trimming the Flash from a Molded Rubber Heel.** C. S. Knight, assignor to Geo. Knight & Co., both of Brockton, Mass., a copartnership composed of G., G. R., C. S., F. S., and C. E. Knight.

2,295,099. **Apparatus to Make Floor Mats.** D. R. Cotterman, assignor to Baldwin Rubber Co., both Pontiac, Mich.

2,295,361. **Rubber Mixer of the Enclosed Type.** C. F. Schnuck, New Haven, assignor to Farrel-Birmingham Co., Inc., Ansonia, both in Conn.

2,295,362. **Mixer for Plastic Material.** C. F. Schnuck, New Haven, assignor to Farrel-Birmingham Co., Inc., Ansonia, both in Conn.

2,295,541. **Machine to Build Base Bands for Use in Making Cord Tire Casings.** W. J. Breth, assignor to General Tire & Rubber Co., both of Akron, O.

2,295,542. **Tire Base Band Building Machine.** W. J. Breth, assignor to General Tire & Rubber Co., both of Akron, O.

2,295,740. **Foam Producing Apparatus.** A. W. Keen, Packanack Lake, Wayne Township, N. J., assignor to United States Rubber Co., New York, N. Y.

2,296,011. **Deposition Form for Use in Manufacturing Rubber Nasal Masks.** C. L. Beal, Cuyahoga Falls, assignor to American Anode Inc., Akron, both in O.

2,296,016. **Tire Mold.** H. C. Bostwick, Coventry Township, assignor to Akron Standard Mold Co., Akron, both in O.

2,296,105. **Apparatus and Method for Making Rubber Masks and Similar Articles.** M. E. Hansen, assignor to American Anode Inc., both of Akron, O.

2,296,800. **Combination Tire Bagging, During, and Debagging Unit.** L. E. Soderquist, assignor to McNeil Machine & Engineering Co., both of Akron, O.

2,297,017. **Apparatus to Form a Tire Tread with Circumferential Ribs.** M. C. Overman, New York, N. Y.

2,297,622. **Apparatus for Continuously Producing Rubber Threads from an Endless Length of Unvulcanized Rubber, with the Combination of Means for Continuously Scoring the Length Along Successively Narrower Lines, Means for Continuously Vulcanizing the Scored Length, until a Plurality of Rubber Threads Are Obtained.** W. P. Herman, Providence, R. I.

2,297,663. **Device to Make Rubber Gloves or the Like Molded Goods, Including Trimming and Beading the Edges Thereof.** O. A. Strassman, Akron, assignor to Seiberling Latex Products Co., Barberton, both in O.

Dominion of Canada

407,051. **Tire Tread Shaping and Truing Machine.** P. E. Hawkinson, Minneapolis, Minn., U. S. A.

407,107. **Centrifugal Filtering Apparatus.** Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of H. F. Jordon, Nutley, N. J., U. S. A.

United Kingdom

546,758. **Molding and Vulcanizing Apparatus.** Dunlop Rubber Co., Ltd., H. Willshaw, and H. Smith.

547,207. **Apparatus for Treating Tires.** United States Rubber Co.

UNCLASSIFIED

United States

2,295,237. **Tire Inflater.** J. J. Rothwell, Elkhart, assignor to Penn Electric Switch Co., Goshen, both in Ind.

2,295,392. **Valve for Use with Plural-Chambered Rubber Inner Tubes.** B. C. Eberhard, Akron, O., and S. T. Williams, Bellerose, N. Y., assignors to Wingfoot Corp., Wilmington, Del.

2,295,441. **Safety Device.** A. J. Wiedinger, Akron, O., assignor to Wingfoot Corp., Wilmington, Del.

2,295,477. **Device for Dispensing Adhesive Tape.** C. S. Jackson, assignor to Peters Bros. Rubber Co., Inc., both of Brooklyn, N. Y.

2,295,804. **Valve with Elastic Valve Plug for Inflatable Articles.** F. R. Olson, assignor to C. B. Webb Co., both of Lebanon, Pa., a copartnership composed of C. B. and G. I. Webb.

2,296,345. **Battery Sales Display Device.** A. N. Guy, Manhasset, assignor to United States Rubber Co., New York, both in N. Y.

2,296,622. **Tire Inflater Valve Mechanism.** C. E. Wehe, Oakland, Calif.

2,297,536. **Tire Cords of Improved Tensile Strength Composed of Grey Cotton Fibers Which Have Been Momentarily Treated with an Aqueous "Alkali Metal Rosinate-Silicate" Solution.** H. M. Buckwalter, Detroit, Mich., assignor to United States Rubber Co., New York, N. Y.

2,297,579. **Tire and Wheel Lock.** H. W. Norberg, Flint, Mich.

Dominion of Canada

406,956. **Parasiticidal Preparation.** Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of W. P. ter Horst, Packanack Lake, N. J.

407,018. **Tire Demonstrating Device.** Wingfoot Corp., Wilmington, Del., assignee of W. M. Bryan and W. F. Peters, both of St. Petersburg, Fla., all in the U. S. A.

407,045. **Tool for Applying Nipples to Nursing Bottles.** E. A. Dolph, Newburgh, N. Y., U. S. A.

United Kingdom

546,644. **Manufacture of Tubing or Sleeves of Fabric Formed of Threads or Cord.** Pirelli-General Cable Works, Ltd., H. Barron, F. Halestrap, A. McAuley, and H. P. Grinyer.

546,743. **Tire Yarn.** Dunlop Rubber Co., Ltd., Dunlop Cotton Mills, Ltd., J. Anderson, and M. Langstreth.

TRADE MARKS

United States

397,283. **Koyalon.** Kneeling pads. United States Rubber Co., New York, N. Y.

397,338. **Kodak.** Squeegees. Eastman Kodak Co., Rochester, N. Y.

397,367. **Firestone.** Polishing cloths. Firestone Tire & Rubber Co., Akron, O.

397,392. **Kleinert's Launderwell.** Dress shields. I. B. Kleinert Rubber Co., New York, N. Y.

397,431. Representation of a fanciful picture of a girl and the words: "**All Out *** Women's Defense Shoe.**" *Shoes.* Gale Shoe Mfg. Co., Boston, Mass.

397,541. **Hyflex.** Extruded plastic tubing for electrical insulation. Irvington Varnish & Insulator Co., Irvington, N. J.

397,542. **Transflex.** Extruded plastic tubing for electrical insulation. Irvington Varnish & Insulator Co., Irvington, N. J.

397,547. **Westward Ho.** Raincoats. Spatz Bros., Inc., New York, N. Y.

397,574. **Firestone.** Playing cards. Firestone Tire & Rubber Co., Akron, O.

397,587. **Firestone.** Key cases. Firestone Tire & Rubber Co., Akron, O.

397,669. **V-Seald.** Waterproofed piece goods treated with a vinyl compound. Chicago Rubber Clothing Co., Racine, Wis.

397,758. **Kleistone.** Composition rubber sheets and blocks. Kleistone Rubber Co., Inc., Warren, R. I.

397,775. **Koyalon.** Foam rubber pillows. United States Rubber Co., New York, N. Y.

397,801. **Airlite.** Sanitary goods. I. B. Kleinert Rubber Co., New York, N. Y.

397,820. **Koyalon.** Insole stock. United States Rubber Co., New York, N. Y.

397,839. **Firestone.** Coasters. Firestone Tire & Rubber Co., Akron, O.

397,874. **Rock Grip Excavator.** Tires. Firestone Tire & Rubber Co., Akron, O.

397,877. **Fluid-Tailoring.** Clothing, including raincoats. Schloss Bros. & Co., Inc., Baltimore, Md.

397,942. **Postboy.** Shoes. A. E. Nettleton Co., Syracuse, N. Y.

COTTON & FABRICS

NEW YORK COTTON EXCHANGE WEEK-END CLOSING PRICES

	Aug. 29	Sept. 26	Oct. 3	Oct. 10	Oct. 17	Oct. 24
Futures						
Oct.	18.48	18.05	18.05	17.87	.....	.....
Dec.	18.64	18.37	18.34	18.16	18.28	18.24
Mar.	18.79	18.59	18.56	18.47	18.43	18.38
July	18.95	18.79	18.77	18.60	18.64	18.54

New York Quotations

October 23, 1942

Drills

38-inch 2.00-yard	yd.	.....
40-inch 1.45-yard		.....
50-inch 1.52-yard		$0.31⅛
52-inch 1.85-yard	.23851	.25⅞
52-inch 1.90-yard	.23223	.25¼
52-inch 2.20-yard		.20511
52-inch 2.50-yard	.185	.21½
59-inch 1.85-yard		.25

Ducks

38-inch 2.00 yard D. F.	yd.	.21½ .22⅝
40-inch 1.45-yard S. F.		.29¾
51½-inch 1.35-yard D. F.		.33½
72-inch 1.05-yard D. F.	.43	.45
72-inch 17-21 ounce		.48⅞

Mechanicals

Hose and belting	lb.	.42¾

Tennis

51½-inch 1.35-yard	yd.	.31½
51½-inch 1.60-yard	yd.	.27⅛
51½-inch 1.90-yard	yd.	.23⅛

Hollands—White

Blue Seal

20-inch	yd.	.13½
30-inch		.24¾
40-inch		.27

Gold Seal

20-inch No. 72	yd.	.14½
30-inch No. 72		.25¾
40-inch No. 72		.29

Red Seal

20-inch	yd.	.12¼
30-inch		.22
40-inch		.24½

Osnaburgs

40-inch 2.34-yard	yd.	.15½
40-inch 2.48-yard		.14⅝
40-inch 2.56-yard S. F.		.14578
40-inch 3.00-yard		.12¾
40-inch 7-ounce part waste		.15
40-inch 10-ounce part waste		.21⅜
37-inch 2.42-yard clean		.15¼

Raincoat Fabrics

Cotton

Bombazine 64 x 60	yd.	.....
Plaids 60 x 48		.....
Surface prints 64 x 60		.....
Print cloth, 38½-inch, 64 x 60		.08971

Sheetings, 40-inch

48 x 48, 2.50-yard	yd.	.16200
64 x 68, 3.15-yard		.13968
56 x 60, 3.60-yard		.11944
44 x 40, 4.25-yard		.09764

Sheetings, 36-inch

48 x 48, 5.00-yard	yd.	.08600
44 x 40, 6.15-yard		.06991

Tire Fabrics

Builder

17¼ ounce 60" 23/11 ply Karded peeler	lb.	.52½

Chafer

14 ounce 60" 20/8 ply Karded peeler	lb.	.51½
9¾ ounce 60" 10/2 ply Karded peeler	lb.	.51½

Cord Fabrics

23/5/3 Karded peeler, 1 1/16" cotton	lb.	.52½
15/3/3 Karded peeler, 1 1/16" cotton	lb.	.50½
12/4/2 Karded peeler, 1 1/16" cotton	lb.	.51½
23/5/3 Karded peeler, 1¼" cotton	lb.	.52½

Leno Breaker

8¼ ounce and 10¾ ounce 60" Karded peeler	lb.	.52½

THE advancing market, despite the new crop being harvested, is due to several factors. The prospect of large government orders in the near future of upward of 100 million yards of cotton textiles and orders to fulfill Lend-Lease agreements have become a dominant influence on the market. Objections are being voiced by the WPB and Army officials who claim the government is buying better quality cotton in the open market in competition with domestic mills in order to supply British demands for better grades at a time when our own needs are not being fully met, and when the 1942 cotton crop is lower in grade and staple than the 1941 crop. The price of 15/16-inch spot middling grade rose from 19.46¢ a pound on October 5 to 20.01¢, October 21, and closed at 20.13¢ on November 2.

Labor shortage is threatening long-staple cotton harvesting as workers continue to be lost in enlistments and selective service. United States consumption of cotton during September was estimated at 960,000 bales by the New York Cotton Exchange Service, compared with 925,000 bales consumed in August and 878,000 bales in September, 1941. There is a possibility that the 99,000 running bale crop of long staple American-Egyptian cotton may break all previous production records. The Crop Reporting Board of the Department of Agriculture has estimated the 1941-42 season cotton crop in the United States as coming nearer to 13,818,000 bales than the 14,028,000 bales predicted a month ago, but even so the crop is expected to be larger than last year's.

An alternative method which cotton ginners may use in determining maximum prices for bagging and ties has been set by the OPA in Amendment No. 3 to Maximum Price Regulation No. 211—Cotton Ginning Service—effective October 10, and provides that a ginner may charge a farmer for the actual cost of bagging and ties or $1.75 for each set of bagging and ties, whichever is the lower. Price Administrator Leon Henderson reduced manufacturers' ceiling prices for carded cotton sales yarns to prevent increases in prices of cotton goods bought by consumers. President Roosevelt, through Commodity Credit Corp. in accordance with the Brown-Wagner Price Stabilization Act, authorized 90% of parity loans on cotton. An increase of 1¢ a pound has been made in loan rates on 1942 cotton, effective October 7, with additional payments made to producers who have already obtained loans on the '42 crop. The Department of Agriculture increased the support price for long staple cotton 3¢ a pound to assure a prompt harvesting.

Fabrics

Military requirements are absorbing the 40-inch 3.60 yard sheetings used in the manufacture of raincoats; some mills are sold well into spring. Finishers are busy on balloon cloths and yardage to be used in the manufacture of collapsible rubber boats. Demand for sheetings used in friction tape continues reasonably heavy. Amendments have been issued affecting prices of sheetings, as follows: Amendment 9 to Revised Price Schedule 35, effective October 28, allows government war procurement agencies buying from non-mill sellers to reimburse them for transportation costs and allows purchasers to pay premium for sheetings to be coated with synthetic resin. Price ceilings have been reduced for wide woven cotton goods (Amendment 2, Maximum Price Regulation 118, effective October 12), and wide osnaburgs (Amendment 18, Revised Price Schedule 35, effective October 12). Reductions ranged from a fraction of a cent to over 5¢ a pound.

Production of ducks continues heavy with about 38% of the output coming from converted mills, including the large spinning mills of rubber companies having curtailed tire production. Sales were far in excess of production with large commitments being made in duck used for covering bullet-proof gasoline tanks.

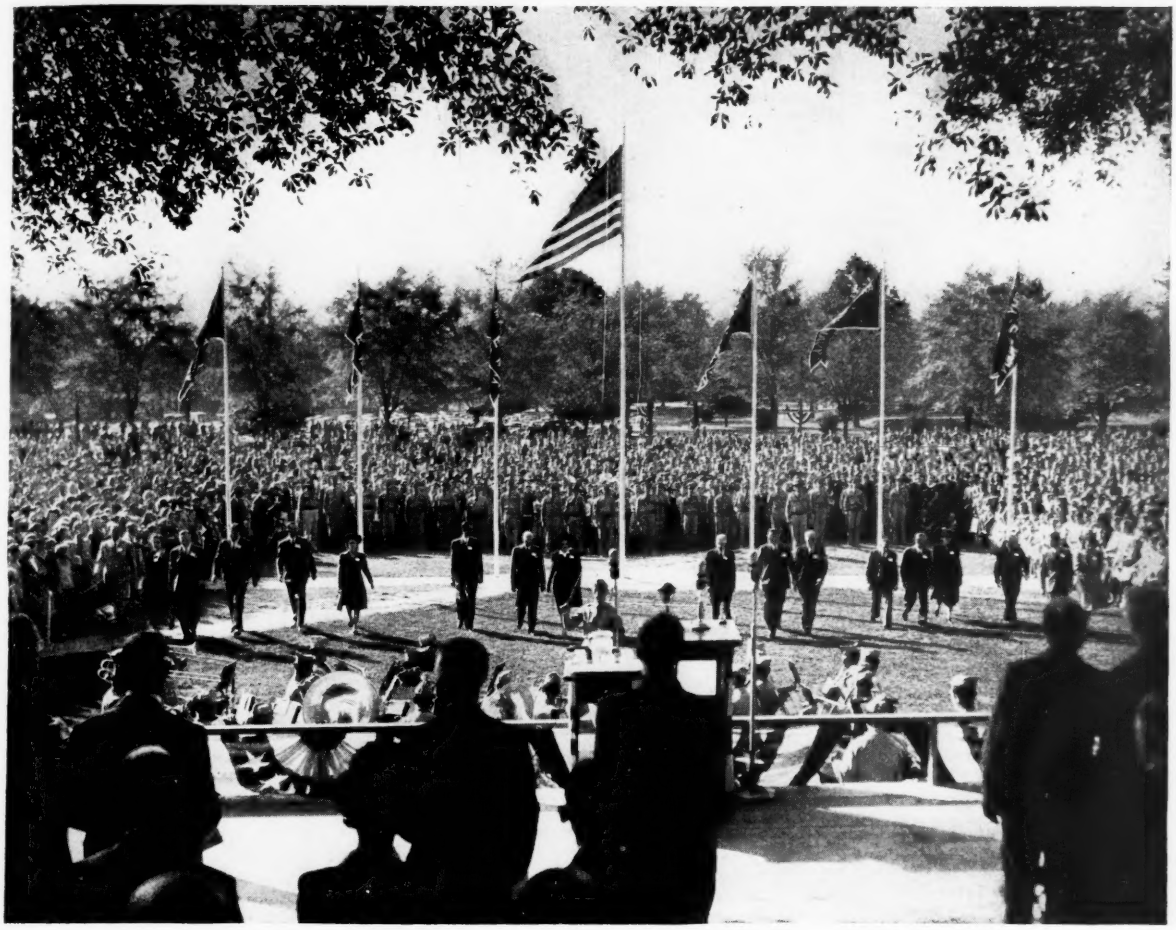
Fabric prices are substantially unchanged except for an increase of ½¢ a pound in tire fabrics and a decline of 1¢ a pound in some drills.

Wanted—A New Name For Buna S Rubber

The rubber trade journals have had many suggestions that we should have an American name for Buna S, our new and vitally important American product. We would like our readers to give this matter careful thought and submit as many new names as they can. The lists will be reviewed, and the results tabulated and given to the proper authorities for consideration. The name should be short, two or three syllables would be best, and need not include any portions of the chemical names of the two major ingredients, may or may not include reference to the war in any way, and should be a name that would lend itself to ready acceptance by the layman as well as the rubber industry. There are no restrictions as to who may submit names, and the reward will only be the pride of the person or persons whose effort will be used for years to come to designate this new American product. Mail suggestions to INDIA RUBBER WORLD and let's get a new and better name as soon as we can. EDITOR.

Protective Coating Stops Tire Checking

EXTRA TIRE MILEAGE PRESERVATIVE is an inexpensive tire-coating material, reported to extend the life of tires by counteracting the effects of aging and other results of climatic conditions that hasten rubber deterioration. It is also said to restore, to a marked degree, the essential properties of flexibility and vitality characteristic of new rubber. Rubber checking, it is claimed, is stopped immediately as the liquid flows into the check cracks. The coating, made from materials now plentiful, maintains its protective value for three months. At the end of that time a new coating should be given. It may be applied with an ordinary paint brush. Firestone Tire & Rubber Co.



AWARD FOR EXCELLENCE

On September 28th, 1942, joint ceremonies were held wherein each of the five mills of the West Point Manufacturing Company was awarded the Army and Navy "E" for excellence in production. More than 10,000 employees were present.

So again, the vital importance of cotton in our war effort is emphasized. We are proud of the wartime production records of each of these mills and we know you've agreed when we said that for the duration "UNCLE SAM COMES FIRST." Naturally, many varieties of cotton duck produced by these mills are needed by the Army and Navy. Normal supplies for commercial use have to be limited during the emergency.

WELLINGTON SEARS COMPANY

65 WORTH STREET, NEW YORK, N. Y.

CLASSIFIED ADVERTISEMENTS

ALL CLASSIFIED ADVERTISING MUST BE PAID IN ADVANCE

GENERAL RATES	SITUATIONS WANTED RATES	SITUATIONS OPEN RATES
Light face type $1.00 per line (ten words)	Light face type 40c per line (ten words)	Light face type 75c per line (ten words)
Bold face type $1.25 per line (eight words)	Bold face type 55c per line (eight words)	Bold face type $1.00 per line (eight words)

Allow nine words for keyed address. *Replies forwarded without charge*

SITUATIONS WANTED

PRACTICAL RUBBER CHEMIST, 14 YEARS' EXPERIENCE COMpounding and processing for tires, mechanical and proofed goods, involving natural rubber and all synthetics. Also experienced with latex, airfoam sponge, and dipped goods. Ph.D. Have held supervisory positions. Location immaterial. Address Box No. 495, care of INDIA RUBBER WORLD.

PRODUCTION SUPERINTENDENT DESIRES CHANGE. NOW employed as such. Qualified by twenty years of broad practical experience to estimate costs, plan processes, compound and supervise the manufacturing of mechanical, sponge and synthetic rubber products. Position as technical superintendent desired. Address Box No. 497, care of INDIA RUBBER WORLD.

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(Classified Advertisements Continued on Page 224)

Classified Advertisements

Continued

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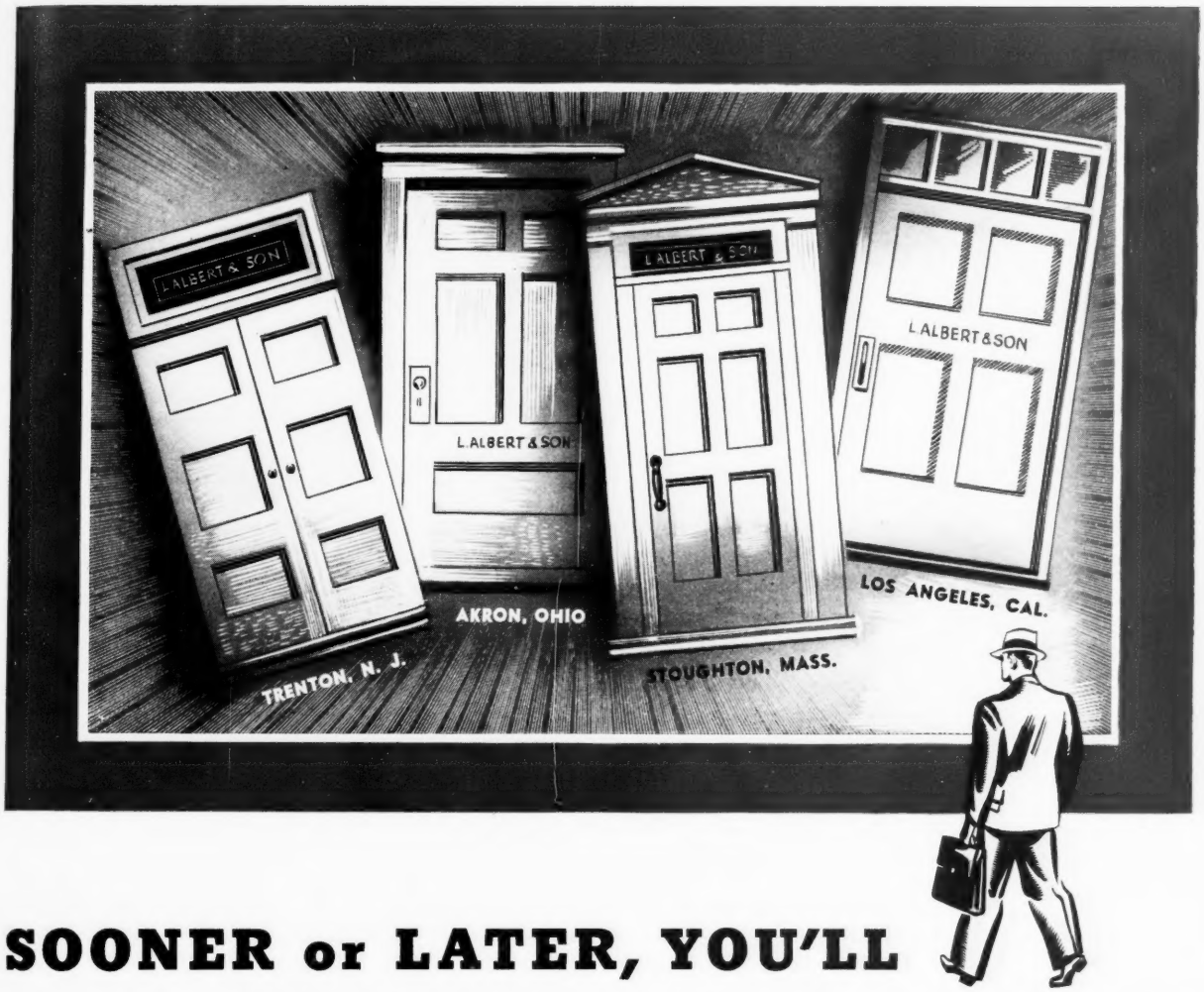

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For the want of a nail
the shoe was lost
For the want of a shoe
the horse was lost
For the want of a horse
the rider was lost
For the want of a rider
the battle was lost
And all for the want
of a horse shoe nail

Let's not lose Victory for want of Scrap Rubber!

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